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British Hang Gliding and Paragliding Association

REPORT

**Investigation of a paragliding incident
which occurred at Chetwynd airfield,
on 26th August 2013
in which the pilot suffered serious injury.**

Introduction

On 27th August 2013 the British Hang Gliding and Paragliding Association (BHPA) received reports of an air incident at Chetwynd in Shropshire that had resulted in serious injury to the pilot. 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 13/123

Summary
On Monday 26th August 2013 four members of the Staffordshire Scouts Air Activities Team met at Chetwynd airfield, near Telford, to take part in paragliding training. These were the club CFI, two pilots acting as assistants and one student. During his first flight, the 38 year old male student, lost control of the Airwave Black Magic paraglider and crashed heavily sustaining serious injuries. The investigation concluded that the incident occurred as a result of the pilot losing control of the paraglider having allowed it to go offline while under tow. There were a number of contributory factors.

This document is confidential until ratified.

Date ratified by the BHPA Flying and Safety Committee: 17th May 2014

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 four 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 Monday 26th August 2013 four members of the Staffordshire Scouts Air Activities Team met at Chetwynd airfield, near Telford, to take part in paragliding training. The four were as follows; the Chief Flying Instructor (CFI), a student pilot under training (Pilot A) and two other pilots who acted as assistants (Assistant A and Assistant B). The four met at approximately 9.30 to 10.00 that morning. The CFI set up an area in which to unload and check the equipment and made an assessment of the weather. The CFI assessed the conditions to be very light with variable winds and some strong thermic activity. The CFI initially set out the equipment from the northeast end of the field but then changed to the southeast end to make best use of what breeze there was.

There then followed a period of approximately 1 – 1.5 hours when the CFI waited for the breeze to establish itself. At approximately 12.00 the decision was made to launch Assistant B as a light breeze had set up. He was towed up on the Black Magic paraglider by the CFI to a height of somewhere in the region of 300-1000ft (witness reports vary widely on the height of this flight). Assistant B made a successful flight where he describes how he "caught some thermals" before landing close to the take off area.

At approximately 12.30 Pilot A was prepared for launch by the CFI, using the Black Magic paraglider that had just been flown by Assistant B. Pilot A was then briefed for his flight by the CFI before being clipped into the harness and readied for launch. Pilot A was briefed to release from the tow line once he saw the Land Rover brake lights and then to commence two 180 degree turns before landing in the region of the take off area. The CFI drove back to the other end of the towline to begin the launch. Assistants A and B acted as wing tip holders and when Pilot A was ready, the signal to begin the launch was given by Assistant A, who was acting as 'launch marshal', using bats. On the first launch, the glider drifted off to the right and the launch was aborted before Pilot A had become airborne. Pilot A was set up again by the CFI who then drove back to the other end of the towline. Once everyone was ready the signal was given to launch once again. This time the launch went as planned though shortly after take off, at a height of approximately 150 - 300ft, Pilot A began to drift to the right. Pilot A however, describes how he actively steered the glider to the right, believing he had been blown to the left by a shift in wind direction, in an attempt to "keep in line with the Land Rover". Noticing the drift to the right, the CFI slowed the tow vehicle to allow Pilot A to come back on line. On seeing the pilot was not coming back on line the CFI stopped the tow vehicle and put it in reverse in an attempt to put slack in the towline. At this point, having seen the Land Rover brake lights come on, Pilot A states that he released himself from the towline and describes how the glider "didn't feel right". He goes on to describe how the glider "veered violently to the right". The CFI then attempted to release the towline at his end by pulling the release line but the release failed to open. The CFI tried repeatedly to release the towline but it did not release until he physically took hold of the release unit and shook it whilst pressing the release catch. Assistants A and B also describe how the glider turned sharply to the right, with the right hand wing tip pointing towards the ground, before diving towards the ground and impacting heavily, at speed. The emergency services were called immediately and Pilot A was placed in the recovery position. In contrast to the account given by Pilot A, Assistant B describes how the towline was still attached to Pilot A (at the pilot end) and that it had to be released from Pilot A in order to facilitate placing him in the recovery position. The emergency services were on site in less than 10 minutes and Pilot A was evacuated to hospital having sustained serious injury.

1.2 Injuries to persons

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

1.3 Damage to the aircraft

None.

1.4 Other damage

None.

1.5 Personnel information

Pilot A is a 38 year old male. On 26th May 2013 Pilot A completed his first training day, including basic pre-flight training and successfully completing five towed flights at heights ranging from 150 to 500+ feet. During these flights Pilot A carried out 90 – 180 degree turns and 'S' turns making controlled landings.

The Chief Flying Instructor (CFI) is a 63 year old male who joined the BHPA in 1982 and gained his instructor licenses in 1985. He currently holds the BHPA Instructor licenses for 'hill paragliding' and 'tow parascending'.

Assistant A is a 65 year old male who joined the BHPA in 2001. He currently holds a BHPA 'parascending round' rating and a BHPA Club Coach licence. The Club Coach licence was awarded in March 2013.

Assistant B is a 21 year old male who joined the BHPA in October 2011. He holds no BHPA ratings or licenses.

1.6 Aircraft information (including towing equipment)

The paraglider was an Airwave Black Magic, size 27 with serial number BM27P63320. The Black Magic was manufactured in the early 1990s making this glider approximately 20 years old. The fabric was found to be in very good condition though a porosity test was not carried out. It was not possible to check the strength or length of the lines. The Black Magic 27 has an all up weight range of 80-110kg.

The harness was a System X airbag harness, size large. It was found to be in good condition.

The tow system consisted of the following components:

Y shaped tow bridle with plastic wire release and three-ring circus. 20cm webbing loops with Maillon Rapide connectors. Drogue chute attached to 3m of hollow braid nylon rope. Main towline made from same hollow braid nylon (approx. 1cm diameter). Weak link (Tost type green 300daN) encased in protective muff. Tensiometer. Gibbs release. Secondary 3 ring circus release. Land Rover.

The tow system was arranged as follows:

The Y shaped tow bridle was attached to the harness at the point where the risers meet the karabiners using the webbing loops. The ‘3 ring circus’ release mechanism at the end of the Y bridle was used to connect the bridle to the large steel ring at the end of the tow line (see photos 1 and 2 below).

Photo 1. Showing Y bridle release system.

Photo 2. Showing bridle attached to drogue chute.

The drogue chute was then attached to the main towline. The main towline was attached to the rear of the Land Rover via the weak link and tensiometer. The Gibbs quick release system was also backed up by a 3 ring circus release. See photo 3 below.

Photo 3. Showing 3 ring circus back-up release.

The CFI highlighted a problem with the Gibbs mechanism in that it failed to release when he realised there was a problem and attempted to release the tow line. This is discussed in more detail in the analysis section of the report.

The tensiometer was found to be in reasonable condition though it had obviously been well used. However, it was immediately clear that the system was low on hydraulic fluid. The unit was taken away to be tested. The results of this test are considered in the analysis section.

1.7 Meteorological information

The weather on the day bright and sunny with light, variable winds with periodic strong thermic activity.

1.8 Communications

Signal bats were used to communicate between launch area and tow vehicle. Pilot A was not fitted with a radio.

1.9 Aerodrome and approved facilities

Chetwynd airfield is situated approximately 12km north of Telford in the Midlands. It is a grass field approximately 1km square. The field is used by the RAF to train helicopter pilots and is also the base of the Staffordshire Scouts Air Activities Team, a BHPA registered parascending club.

1.10 Medical and pathological information

Pilot A sustained multiple, complex fractures to his pelvis, spine and ribs and suffered internal bleeding.

SECTION 2 – ANALYSIS

2.1 The investigation considered the equipment used.
The Airwave Black Magic paraglider was found to be in good condition despite it's age. It was of a suitable type and size for Pilot A. The System X harness was also of a suitable type and size. The investigation did not consider the airworthiness of the glider or harness to have been a factor in this incident.

The Gibbs quick release failed to operate correctly when the CFI made the decision to cut the towline at the vehicle end and again when tested by BHPA investigators. A direct comparison test was subsequently made with an identical unit known to function correctly. Once again the incident Gibb release failed to operate correctly whereas the unit used for comparison did. It proved impossible to visually identify the difference between the faulty Gibb release and the release used for comparison. The unit has been sent for further testing.

Photo 4. Showing Gibbs release mechanism with towline attached via weak link.

The weak link used was a Tost green 300daN type. For the purposes of tow paragliding the BHPA Technical Manual states that;

"Approved maximum weak link values for tow launch operations.
1. All weak link values stated are maximums.
2. All weak link values stated are for professionally purpose built calibrated weak links such as Tost and Koch. These values must be reduced by 20% if using any other type of weak link.
3. 1daN is approximately 1kg force."

And;

"Paragliders:
Up to 125 kg total weight in flight: 125daN weak link
More than 125 kg total weight in flight: 150daN weak link"

With the 'all up' weight of Pilot A being approximately 110kg, the weak link should have had a value of 125daN or less. Given the tow tensions used (see below), a correctly calibrated weak link to the specified value of 125kg would have failed, thereby preventing the excessive tow force.

The tensiometer was examined and tested at given tensions then compared to readings from a calibrated digital tensiometer. The results are as follows:

- The master cylinder, although not showing signs of leakage, did have signs of rust and heavy use.
- The hose was intact and showing no signs of leakage.
- The pressure gauge shows signs of heavy use but was intact and the needle freely moving.
- The system was low on hydraulic fluid as first suspected.

Comparative readings were as follows:

Reading in "10"`s	Reading converted to KG`s	Actual Tension KG`s
0	0	Needle moved off stopper at
1	25kg	80kg
2	50kg	88kg
3	75kg	123kg
4	100kg	160kg
5	125kg	200kg
6	150kg	230kg
		270kg

The CFI stated that he operates the tensiometer at a tension of 3 to 4 for paragliders. This would give a tow tension of approximately 75 to 100kg on a properly calibrated tensiometer, correct for towing paragliders. In this case however it meant that actual tow force was between 160 and 200kg and therefore well in excess of the tow tensions recommended for towing paragliders.

Towing at these tensions would result in the following:
The glider would gain height more rapidly than would normally be expected.
The glider would be too far behind the pilot during the tow, rather than being above his head.
The glider could be more prone to stalling.
The glider would be more prone to 'lock out' if the glider gets off line.
There would be a more extreme reaction if line or link were to break.
And in general the whole launch would be more difficult for a novice pilot to handle.

The investigation considers the faulty tensiometer, use of the wrong grade of weak link and failure of the Gibbs release to operate immediately to have have been factors in this incident.

2.2 The investigation considered the personnel present.

The BHPA Technical Manual states that in order to run a tow training operation there must be at least an instructor in the required discipline to take overall charge, and a suitably qualified operator to operate the tow equipment (be that static winch or fixed line vehicle tow). It also states in chapter 1 of Section 2, 'Operating Procedures' that;

"*Supervision - Students should at all times be under qualified supervision; this will range from the Day 1 situation of 'very close supervision' through to near-CP award of 'watchful attention'. Very close supervision means that the instructor is in direct audio/visual contact with the student - they are close enough for there to be no misunderstanding as to what is intended and, in case of problems, the necessary corrective actions can be taken.*"

In this situation there should have been, at the very least, an instructor with a 'paragliding tow' licence working with the student, and an operator signed off as able to tow paragliders driving the

tow vehicle. On the day in question the Staffordshire Scouts Air Activities Team consisted of the CFI, who did not hold a 'Paragliding Tow' Instructor licence, an assistant who held a BHPA Club Coach licence, which is a licence not applicable to this training environment, and an assistant who had no ratings or licenses at all. Not only was there nobody present with the correct qualifications, the CFI who should have been with the student, was driving the tow vehicle.

The investigation considers that the lack of qualified personnel to have have been a factor in this incident.

2.3 The investigation considered the weather conditions.
Conditions on the day as described by the CFI were very light, in terms of wind strength, with variable wind direction and strong thermic activity. The thermic activity was thought responsible for the fluctuating wind direction. The light winds would normally be considered ideal for paraglider tow training, especially if the wind was of constant strength and direction. Strong thermic activity however, would not be considered suitable. Thermic activity, by its very nature, gives rise to turbulent air that can pitch the paraglider about and cause the paraglider to collapse if not controlled correctly. While some light thermic activity may be acceptable (and possibly unavoidable) for students towards the end of their BHPA Club Pilot training and who have practised collapse recovery, it would not be considered appropriate for an Elementary Pilot on his or her second day.

The investigation considered the weather conditions on the day to have have been a factor in this incident.

2.4 The investigation considered the training given to Pilot A.
On 26th May 2013 Pilot A completed a total of five training flights on a 310 parascending canopy. These flights are logged on the school 'Daily Flight Record' and noted in Pilot A's 'Student Training record' book. Pilot A then had one further flight, the incident flight, on 26th August, some three months later, on an Airwave Black Magic paragliding canopy.
The BHPA 'Student Training Record' (STRB) book for Parascending Square states that;
"Flights (i) Straight towed flights
The student should combine the skills practised on the ground in Phase 2 to make straight ahead flights after releasing from the towline landing safely.
Straight towed flights (in the region of 60m/200ft high) – operator signals for pilot to release – flying canopy forward and flaring appropriately. ***At least 4 successful flights must be made.****"*

The accompanying Instructor notes state that;
"Instructors must be completely satisfied that a student has mastered 'control on tow' skills and the 'nodding dog' technique. Landing flare/stalls should be watched critically and perfected before allowing progression to the next stage of the exercise."

Pilot A's first two flights are entered in his STRB in the 'Flights (i) section. His second two flights are entered in the 'Flights (ii) section. 'Flights (ii)' requires a minimum of three successful flights to be logged but also that "*The student should reach a reasonable and consistent level of competence and confidence at being towed to greater heights…*"
It must be stressed that these logged flights are considered a 'minimum' and that to achieve the required number of 'successful flights' and to achieve the required level of 'competence and confidence' would take considerably more. Hence the inclusion in the STRB for noting 'Flights attempted' as well as those successful, to the point where the Instructor notes state that; "*It is important to note (on the record) the approximate number of flights attempted, as this is a key piece of information in assessing the student when you check their record perhaps months later.*".

Clearly, having only completed five flights in total, Pilot A can not possibly have reached the standard required to enable him to progress through the syllabus.

Pilot A's second training day was three months after his first. He was briefed to make a flight that included a series of 180 degree turns and to make a landing close to the take off area, essentially a direct continuation of his first training day but on an unfamiliar glider. The BHPA Instructor notes state that;

"*Interruptions in training: It is not uncommon for students to have interruptions in their training. With gaps of just a week or two it is usual to have to take the student back a few stages to refresh. With gaps measured in months this refresher training needs to be much more comprehensive, and should include refreshing PLF's.*"

Pilot A was given no refresher training despite there being three months since his last training session. He was also given a different canopy to use. Under normal circumstances it would be expected that any major change of equipment would involve a period of ground-based practice in order for the pilot to become familiar with any differences in handling etc. While the Airwave Black Magic is an older generation paraglider, it is significantly different from the 310 parascending canopy use previously by Pilot A.

The investigation considers the lack of refresher training, the rate at which Pilot A was progressed through the BHPA training syllabus and the fact he was given an unfamiliar glider to have been significant factors in this incident.

2.5 The investigation considered the system of communication used on the day.

The launch marshal, Assistant A was using a signal bat to communicate with the CFI driving the tow vehicle. No other form of communication was used on the day. Pilot A had been briefed to make 180 degree turns during his flight. He was at a height somewhere in the region of 150 to 300 feet when the departure from normal flight occurred. It could reasonably be assumed that the height gained would have been greater had the uncontrolled situation not occurred when it did. This would equate to, at the very least, "Exercise 14. Flights iii – Introducing turns" in the STRB for Paragliding Tow and "Exercise 13. Flights ii – Introducing turns" in the STRB for Parascending Squares and would also be considered a 'high solo' flight. The STRB clearly states that for this exercise "Direct communication from an instructor should be available" and the BHPA Technical Manual states that; *It is recommended that schools should use an approved ground to air radio for the longer solo flights.* ***This is a requirement*** *when only one instructor is present for the student's high solos.*

Pilot A was not on radio and once airborne had no direct communication of any type with anyone on the ground. Once it was clear the pilot had gone off line there was no way for anyone to give instruction in an attempt to rectify the situation before it became serious. Had the student been on radio, in line with BHPA requirements, it is possible that the correct commands could have been issued and the potential danger averted.

The investigation considers the fact that Pilot A was not fitted with a radio to have been a significant factor in this incident.

SECTION 3 – CONCLUSIONS

The investigation concluded that the incident occurred as a result of the pilot losing control of the paraglider having allowed it to go offline while under tow. The following being contributory factors to a greater or lesser degree:

1. Lack of refresher training and accelerated rate of progression through the BHPA syllabus.
2. Student given an unfamiliar glider.
3. Lack of effective means of communication between the CFI and student.
4. A faulty tensiometer, use of the wrong grade of weak link and failure of the Gibbs release.
5. Lack of properly qualified personnel.
6. Unsuitable weather conditions.