

REPORT

Investigation of a powered paraglider incident which occurred at Pilling, Lancs., on 23rd October 2016 in which the pilot suffered fatal injury.

Introduction

On 23rd October 2016 the British Hang Gliding and Paragliding Association (BHPA) received reports of an air incident at Pilling in Lancashire that had resulted in the death of 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 GBR-2017-4356

Ratified by the BHPA Flying and Safety Committee 23rd April 2017

Summary

On Saturday 22nd October 2016 a paramotor pilot was flying his Jojowings Instinct paraglider coupled to a Flymecc Carbon LC paramotor in an area just east of Pilling in Lancashire. At 10.45am he lost control of his glider at low altitude and crashed sustaining fatal injuries. A BHPA investigation was convened and concluded that the pilot lost control of the paraglider when flying at low altitude through thermic turbulence, and was unable to effect a recovery before impacting the ground.

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 Saturday 22nd October 2016 four paramotor pilots met at Chestnut Farm, near Pilling in Lancs, with the intention of flying together. The incident pilot, Pilot A, was one of the four pilots. The weather on the Saturday was light winds with sunshine. All four pilots flew during the Saturday though Pilot B states that Pilot A had trouble launching in the afternoon and consequently decided to stop for the day. It was noted by the other three pilots that Pilot A had stumbled on one attempted launch and caused some minor damage to the outer rim of the paramotor cage. This was repaired on site.

On Sunday 23rd October the weather was sunny with some cumulus cloud and a wind from the east at approximately 8mph occasionally gusting to 12-14mph at ground level. At 10.22am Pilot A took off having had one failed launch attempt. He did a circuit of the take-off field while gaining height before heading north and out over the sea. He then flew in a wide arc in a west and then southerly direction taking him back inland over open farmland. Pilot A was the only one of the four pilots airborne. Shortly before 10.45am Pilot A was seen by the other pilots to fly over the take-off field in a direction and altitude indicating that he may be about to make an approach for landing. However, he carried on flying and made a turn to the right in a southerly direction taking him out of the sight of the other pilots. Shortly after this the pilots reported hearing a “pop” noise and assumed Pilot A had had some sort of engine issue. When Pilot A did not return the other pilots became concerned and set off on mountain bikes to look for him. At 11.02am Pilot A was located in a field approximately 300m south of the take-off field. Pilot D noted that the wind speed at the time they located Pilot A was now at around 17mph. Pilots B and C carried out CPR while Pilot D called for the emergency services. The air ambulance arrived after approximately 15 minutes. 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 glider was not damaged in the incident. The power unit suffered significant damage.

1.4 Personnel information

Pilot A was a 37 year old male with a body weight of 80.2kg. He was not a member of the BHPA and did not hold any recognised ratings. The pilot undertook a course of paramotor training with non-BHPA school, Yorkshire Paramotors, beginning in November 2013. He completed a total of six training days with Yorkshire Paramotors between November 2013 and June 2014 though, according to the school CFI, he did not complete his final assessment before leaving the school. Yorkshire Paramotor records show the pilot completed all the theory sections of the course and attained a score of 100% in their theory exam.

The Investigation was unable to establish the pilot’s flying experience, as no flight log could be found.

Evidence from the other pilots there at the time of the incident suggests Pilot A had flown somewhere in the region of 16 to 20 days with them, since training with Yorkshire Paramotors.

1.5 Aircraft information

The glider was a Jojowings Instinct, size small. Serial number; IS 140403VVK. Manufacture date; 3/4/2014. This model was first certified as a paraglider wing in 2005. It was certified with standard (non-trimmer) risers with a weight range of 65-85kg under the AFNOR certification system that existed prior to EN standardisation for paraglider flight safety characteristics, and achieved a rating of "Standard". In its current guise as a paramotor wing, the Instinct is sold with risers equipped with trimmers and an extended manufacturer recommended weight range of 65-110kg. The glider is uncertified in this configuration.

The glider was sent to a paraglider service centre to be checked against the manufacturers specification. The results of this inspection are discussed in the analysis section of the report.

The glider was then sent to a paraglider certification test centre in Switzerland to have the glider flight-tested. The results of the flight tests are discussed in the analysis section of the report.

The power unit was a Flymecc Carbon LC. On inspection it appeared to have been in good condition but was severely damaged in the impact. Damage was consistent with a massive impact to the left lower side of the unit. The propeller was severely damaged, losing both blades at a point approximately 20cm from the prop shaft.

1.6 Meteorological information

An 'aftercast' was obtained from the Met Office. A summary of their findings is as follows:

"Summary of findings

An analysis of the available weather information for the date and location of the accident shows that while there were strong winds expected at gradient heights (2000FT), these were not expected to cause strong winds or gusts at low level. While there are relatively few observing stations with the capacity for recording winds - especially as Warton Aerodrome is not operational on a Sunday - no strong winds or gusts were reported at Blackpool and the wind direction of 070 degrees was not favourable for lee gusts or mountain wave activity from the Lake District, and the gradient winds were not strong enough to be favourable for lee gusts or mountain wave activity from the Pennines.

While the representative radiosonde ascent from Nottingham/Watnall indicated favourable conditions for light to moderate thermal activity, no cumulus cloud is visible on the satellite imagery at the time of the accident, although this does not preclude some weak, dry thermal activity."

The weather observed by Pilots B, C and D indicate that the wind was from an easterly direction at a speed of approximately 8mph, occasionally gusting to 12-14mph. At the time of the incident the wind had increased at ground level to approximately 17mph. Wind speeds were measured on site by Pilot C, using an anemometer.

1.7 Site information

The site is an area of farmland approximately five kilometres to the east of Fleetwood in Lancashire and overlooking Morecambe Bay to the north. The area is flat and made up of a patchwork of large fields. There is little in the way of obstacles apart from the occasional farm building and the odd patch of trees. The area would be considered ideal for paramotoring.

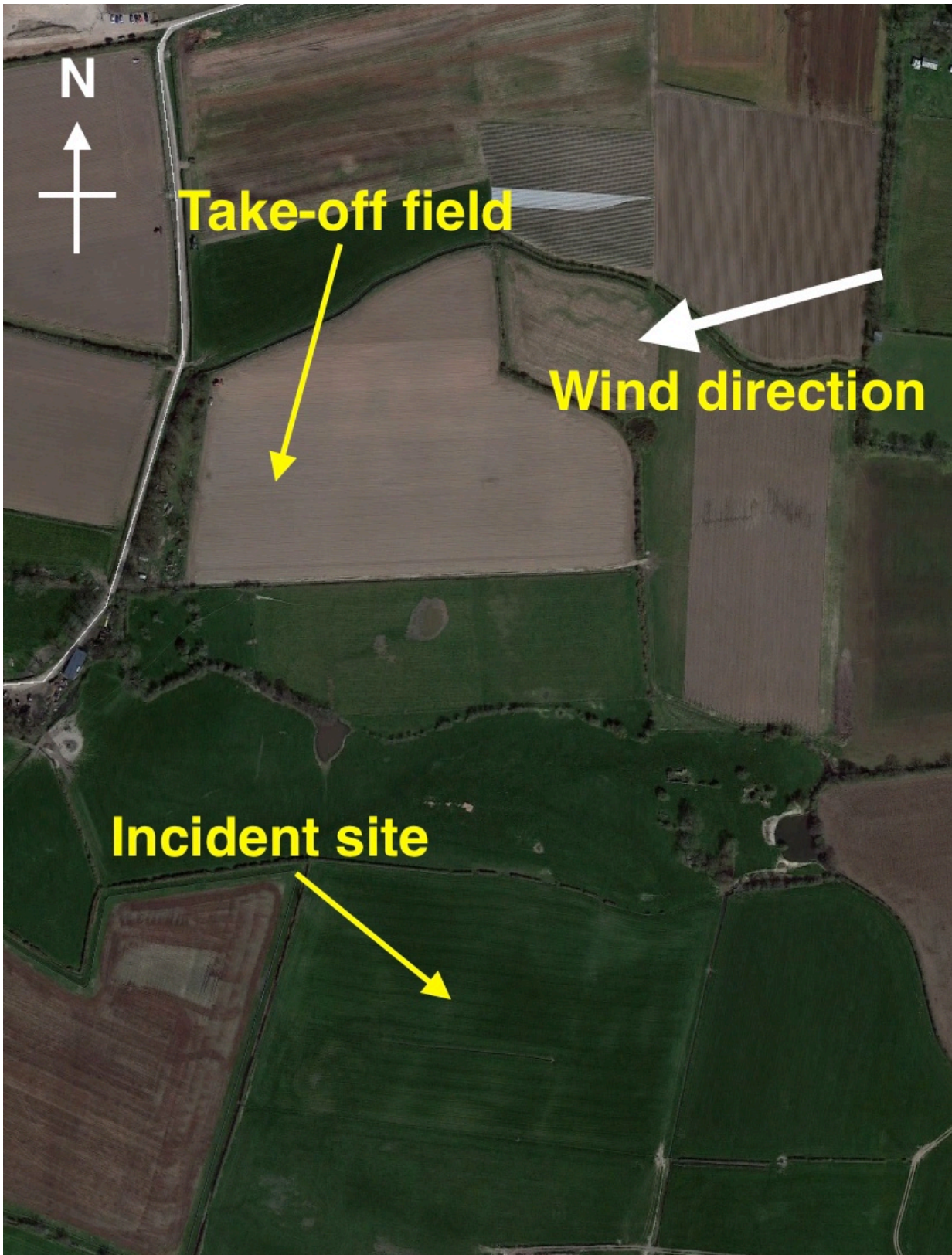
1.8 Flight recorders

The pilot was using a Garmin Etrex 30 GPS unit. Data from the unit has been analysed and the findings are discussed in the analysis section of the report.

1.9 Wreckage and impact information

The incident occurred over a large field approximately 300m south of the take-off field. With the prevailing wind in an easterly direction there were no obvious sources of mechanical turbulence. Figure 1 below shows the take-off field and the incident site.

Figure 1.



1.10 Medical and pathological information

The pilot died from internal injuries consistent with a fall from height.

1.11 Survival aspects

The pilot was carrying a suitable emergency parachute. The parachute had not been deployed.

SECTION 2 – ANALYSIS

2.1 The Investigation considered the weather at the time of the incident.

The Met Office aftercast indicated strong gradient winds of around 35mph at 2000ft from a direction just north of east, and light to moderate thermic activity.

The conditions in the immediate area as reported by Pilots B, C and D were sunny with some cumulus cloud. At approximately 10am Pilot C measured the wind speed using an anemometer and recorded a speed of 8mph, gusting to 12mph, from an east north-easterly direction. This is consistent with the Met Office report. The pilots were not aware of the pressure gradient winds forecast by the Met Office.

Evidence from Pilot A's Garmin GPS unit suggests the wind was significantly higher at an altitude of 100-300m (300-1000ft). When flying with the wind Pilot A recorded a maximum ground speed of 52mph. While flying into wind his ground speed dropped to around 6-7mph. This would give a glider trim speed in the region of 29mph and an estimated wind speed of around 20-25mph. Given the expected increase in wind strength with height, this calculated wind speed is consistent with the Met Office's estimate of 35mph at 2000ft.

This wind speed when combined with thermic activity can create pockets of rising air sufficiently turbulent to cause a paraglider wing to suffer a collapse.

The Investigation considers that the wind strength, in conjunction with the probability of turbulent air associated with the evident thermic activity, was a significant factor in this incident.

2.2 The Investigation considered the data from the Garmin Etrex 30 GPS unit.

The flight data shows Pilot A took off at 10.22am and flew for 23 minutes before the incident occurred. The flight trace shows smooth, coordinated turns during which Pilot A attained a maximum altitude of just over 300m (1000ft). At 10.37am Pilot A adjusted his course taking him back towards the take-off/landing area. At this point he was at an altitude of 200m (600ft) and approximately 1km from the field. He continued to lose height gradually as though making a landing approach. Pilot A crossed into the landing field at 10.44am, at approximately 300ft. He continued losing height to the point where he was approximately 150ft above the field. At this point he turned right and began to fly in a southerly direction, possibly because he decided he was still too high to make a landing in the field. Pilot A continued in a southerly direction for approximately 30 seconds, flying straight and in a gentle climb, at a constant speed. At 10:45am, the instrument recorded a sudden rapid loss of height (up to 20m/s), indicating a significant departure from normal flight. When the incident occurred Pilot A was at an indicated altitude of 60m (200ft). The area where the incident occurred is at a known altitude of 5m. The Garmin unit showed an altitude of 22m for the same position, indicating an error of 17m. This is most likely because Pilot A did not set his instrument prior to flight. Allowing for the 17m variation the initial loss of height occurred at an altitude of 43m (140ft), only 38m (125ft) above the ground, giving the pilot significantly less time to rectify the problem. The onset of the incident to the point of impact took approximately 6 seconds. Until the point when the incident occurred there is nothing unusual in the flight data.

2.3 The investigation considered the Flymecc power unit.

On inspection the Flymecc engine was found to be clean and in good condition. There had been some minor damage done to the outer rim of the cage on the day before the incident but this is not thought to have been significant. It was sustained when Pilot A stumbled over during a launch attempt. There was no damage to the propeller indicating that the impact was minimal.

The Flymecc was severely damaged in the incident itself, suffering massive damage to the cage and the structural framework. Both blades were smashed from the propeller at approximately 20cm from the prop shaft indicating that the prop was still spinning and under power when the unit hit the ground. Evidence suggests that the Flymecc was functioning normally at the time of the incident.

2.4 The Investigation considered the Jojowings Instinct paraglider.

2.4.1 The glider was sent to an independent service centre to be checked and to establish whether the lines were within the manufacturer's tolerance. The glider was found to be in very good condition though the suspension lines had suffered from shrinkage. The shrinkage was found to be uniform across the span of the glider and more pronounced towards the trailing edge. An average shrinkage of 29mm was recorded. The shrinkage at the leading edge was in the region of 20mm and at the trailing edge 40-50mm. The net result is that the glider has a raised angle of attack and would fly slightly slower than the manufacturer intended.

Setting the trimmers to fast counteracts the affect of the shrinkage as it brings the angle of attack back down and allows the glider to fly faster. In this incident the trimmers were set to fast so it is unlikely that the line shrinkage had any detrimental effect on the ability of the glider to return to normal flight after a collapse.

It was noted that the certification sticker attached to the glider is misleading in that it applies to a form of the glider that was tested in 2005 that did not have trimmers on the risers. In 2005 the original model of the glider without trimmers achieved a rating of AFNOR Standard, meaning it was suitable for beginners. The date of manufacture for this glider is noted as 21st April 2014. The certification standard under which conformity testing was carried out on 21st April 2005 was no longer current and had been superseded when this particular glider was manufactured. In any case, the addition of the trimmers on the risers would render any previous certification invalid.

2.4.2 The glider was then sent to an independent flight test centre situated in Switzerland. The glider was tested at the manufacturer's recommended maximum weight of 110kg and also at Pilot A's 'all up' weight of 125kg, to establish whether the addition of trimmers made the paraglider's safety characteristics in flight significantly different from the original AFNOR "Standard" certification (as being suitable for beginners). Pilot A's all up weight is based on his recorded body weight of 80kg, plus the weight of his clothing and flying equipment (including the glider, engine and fuel).

The flight tests were carried out using the current EN 926-2 certification standard as a guide.

Results of the flight tests are as follows:

110kg with trimmers set to slow (neutral)

Symmetric front collapse - reopens without pilot intervention if a little slow, and rocks back less than 45°. This would achieve EN B according to EN 926-2.

Asymmetric collapse – rotates between 90-180° and dives between 15-45°. This would achieve EN B according to EN 926-2.

110kg with trimmers set to fast.

Symmetric front collapse – glider requires pilot input to reopen. This would achieve EN D according to EN 926-2.

Asymmetric collapse – asymmetric collapses in excess of 50% resulted in the canopy diving and rotating rapidly requiring immediate pilot intervention. This would achieve EN D according to EN 926-2.

125kg trimmers set to slow.

Symmetric front collapse - reopens without pilot intervention if a little slow, and rocks back more than 45°. This would achieve EN C according to EN 926-2.

Asymmetric collapse – rotates between 180-360° and dives between 45-60°. This would achieve EN C according to EN 926-2.

125kg trimmers set to fast.

Symmetric front collapse – glider requires pilot input to reopen. This would achieve EN D according to EN 926-2.

Asymmetric collapse – asymmetric collapses in excess of 50% resulted in the canopy diving and rotating rapidly requiring immediate pilot intervention. This would achieve EN D according to EN 926-2.

In summary the test centre has indicated that in its current form the glider would achieve a rating of D under the current EN 926-2 certification standard. The standard classifies gliders in four classes from A to D, where A class gliders have the highest passive safety and D have the lowest passive safety. D class gliders are described in the EN standard as follows:

“Paragliders with demanding flying characteristics and potentially violent reactions to turbulence and pilot errors. Recovery to normal flight requires precise pilot input. Designed for pilots well practised in recovery techniques, who fly very actively, have significant experience of flying in turbulent conditions, and who accept the implications of flying such a wing.”

Pilot A flew the wing at 15kg over the top of the manufacturer’s weight range. High wing loading is known to increase paragliders’ dynamic responses to collapses and other departures from normal flight, and this is evident from the test pilot’s report on the wing when flown at 125kg.

It is clear that the addition of the trimmer risers and extended weight range has completely changed the overall flight safety characteristics of the glider, from one that was suitable for low airtime paraglider pilots, to one requiring highly tuned piloting skills in the event of a departure from normal flight.

The Investigation therefore considers the paraglider to be a significant factor in this incident.

2.5 The Investigation considered training, experience and currency of the pilot.

2.5.1 Pilot A completed 6 training days with Yorkshire Paramotors over a period of 7 months from November 2013 to June 2014. Yorkshire Paramotors are not a member of the BHPA or equivalent governing body and consequently their training is not subject to external quality assurance. The Yorkshire Paramotor syllabus appears very similar to that of the BHPA Paragliding (Power) Club Pilot (Novice) syllabus. Scanned images sent by Yorkshire Paramotors show the syllabus was signed off by Pilot A and the school CFI on 21st June 2014. In his statement the school CFI says that Pilot A did not return to finish his final day of training. During the training Pilot A had completed solo flights and had also carried out an accompanied cross-country flight. The records also show that Pilot A had completed the Yorkshire Paramotors theory exam with a pass mark of 100%. It would not be considered unreasonable for a competent student to reach a level where solo flight was achieved within 6 days.

2.5.2 In the absence of any logged flight details, evidence from Pilot A’s flying friends suggests he had flown with them on approximately 16 to 20 days since June 2014. The exact number of flights is unknown but could be anywhere from 20 to 40 or more. Either way this would be considered low in terms of experience. Pilot D stated that the last time Pilot A flew was approximately four weeks prior to the incident weekend. This would indicate that Pilot A might not have been particularly current at the time of the incident.

The Investigation considered that the level of experience and currency of Pilot A, while on the low side, was not unreasonable or unusual for a pilot after 3 years flying. It is however, significantly below the level of experience deemed by the BHPA as appropriate for flying an EN D glider, or a glider that exhibits the recovery characteristics of an EN D class paraglider. The level of pilot experience recommended by the BHPA for an EN D category wing is as follows:

“...significant experience of flying in turbulent conditions... flying many years +200hrs a year often in strong thermic conditions”

For this reason the Investigation considers the experience and currency of the pilot to have been a significant factor in this incident.

SECTION 3 – CONCLUSION

The Investigation concluded that the pilot lost control of the paraglider when flying at low altitude through thermic turbulence, and was unable to regain control before impacting the ground.

The Investigation found that the combination of high wing loading and the fast trim setting applied by Pilot A to the non-standard risers, would have made the departure from normal flight more rapid and violent, and as such was a significant contributory factor to the outcome of the incident.

SECTION 4 - SAFETY RECOMMENDATIONS

The Investigation recommends that the BHPA issue a safety notice warning pilots about the potential certification irregularities with Jojowings Instinct paragliders fitted with trimmers on the risers.

The Investigation recommends that the BHPA, via its members' magazine Skywings, remind pilots about the potential dangers of line shrinkage and the need to have their gliders regularly serviced.

The Investigation recommends that the BHPA, via its members' magazine Skywings, remind pilots about the importance of remaining within the weight range stipulated by the manufacturer.