ACCIDENT

Aircraft Type and Registration:	Pegasus Quantum 15, G-MZCR
No & Type of Engines:	1 Rotax 503-2V piston engine
Year of Manufacture:	1996 (Serial no: 7234)
Date & Time (UTC):	16 July 2016 at 1430 hrs
Location:	East Haxted Farm Airstrip, near Edenbridge, Kent
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - 1 (Serious) Passengers - N/A
Nature of Damage:	Wing, trike and propeller damaged
Commander's Licence:	Private Pilot's Licence (A) Microlight aircraft
Commander's Age:	90 years
Commander's Flying Experience:	368 hours (of which 261 were on type) Last 90 days - 2 hours Last 28 days - 1 hour
Information Source:	AAIB Field Investigation

Synopsis

The pilot was landing on a grass runway at East Haxted Farm Airstrip after a local flight. Low to the ground he experienced some thermal activity and turbulence which caused the left wing to lift suddenly. He decided to abort the landing and applied power, using the foot throttle, to go around. The aircraft started to climb but he was unable to prevent it turning right and it struck a tree in a hedgerow adjacent to the runway. The pilot was seriously injured.

History of the flight

The pilot arrived at the East Haxted Farm club hangar facility in the morning. He was the owner of G-MZCR, a Pegasus Quantum flex-wing microlight, and had kept it at the club for a number of years. He was not able to rig or de-rig it alone because of the weight and awkwardness of fitting the wing to the trike, so the operator of the airstrip helped him to prepare the aircraft for flight. He also would always help him with de-rigging and putting the aircraft away afterwards.

The airstrip operator stated that it was the pilot's custom to fly either early in the morning or in the early evening when conditions were most likely to be calm and the air smooth. He departed on a planned flight himself that afternoon and, when he left, he believed that the pilot would not attempt to fly before he had returned.

In the early afternoon the pilot spoke with several people who were around the club hangar area; they reported that the conversations were routine. He then carried out all the normal pre-flight checks on his aircraft, started the engine and taxiied out towards the grass runway designated Strip 4 (Figure 1). He noticed the cloud cover had increased and suspected there might be thermic conditions. Strip 4 is 530 m in length and orientated 270°M (into wind on the day). It is located 1 km to the south-east of the club hangar (taxiing distance 1.6 km), from where it is out of sight.

The pilot reported that the takeoff was fine but, as he climbed, he realised that the conditions were quite bumpy. He flew around to the south-east for a while and then returned to East Haxted, descending gradually for an approach to Strip 4. As he neared the ground he encountered very rough air, the left wing lifted and the aircraft veered off course. He decided to go around but was unable to correct the direction of the aircraft which flew towards the trees and hedgerow on the north side of the runway.

Google Earth imagery date 6/6/13 - accessed 20 July 2016

Figure 1

East Haxted Farm layout, including Strip 4 (indicated by red arrow).
Circled numbers indicate strip designations.

At around 1430 hrs, a witness walking her dog in an easterly direction along Strip 4, saw what she thought was a microlight aircraft in the distance on approach to land. She moved about 30 m to the north of the runway to be clear. She watched the aircraft approaching to land and described it as appearing “too fast and at too acute an angle” and “a bit wobbly”. It came down to within four feet of the ground, rose up and dipped a couple

of times before the landing was aborted and it started to climb. As it climbed it turned towards her and she became concerned that it might not clear the trees in the hedgerow. She watched as the aircraft flew into, and became entangled in, the branches of an oak tree at a height of around 15 feet.

The pilot only became aware of this witness when she called out to ask if he was alright. He replied that he was but that he would need the assistance of the Fire Service. She called the emergency services and remained with the pilot until they arrived. The emergency services personnel took several hours to release the pilot from the aircraft; he was subsequently airlifted to hospital suffering from injuries to his chest and right hand.

Accident site and wreckage examination

The aircraft crashed into a 20 m tall oak tree approximately halfway along Strip 4 at East Haxted Farm. The tree was part of a boundary hedge, displaced approximately 60 m to the north of the runway centreline (Figure 2).

Broken branches showed that the aircraft had struck the tree close to the top, at low speed, before then being arrested by the tree canopy. The progressive breakage of the tree branches beneath the aircraft's wing, coupled with the aircraft's low mass, resulted in relatively minor damage to the aircraft which was substantially intact and found resting in the tree canopy, about 5 m above ground level.

The aircraft was recovered to ground level and examined. The engine's crankshaft was free to rotate normally and fuel was present in both carburettor bowls. Tip damage to each of the propeller's three blades indicated that the engine had been running and producing power at impact. The hand and foot throttle controls were tested and found to function correctly. Forty litres of two-stroke fuel were recovered from the fuel tank, which has a capacity of 49 litres.

One of the left lower side rigging cables had failed in tensile overload and the second had been cut by the emergency services. The luff control wire, which controls the shape of the wing trailing edge for trimming purposes, had also failed in tensile overload. All other rigging cables were intact and were in good condition. The flying control bar had been bent, probably by contact with the pilot's body during the accident impact. The trim control was set to the takeoff position which is also appropriate for landing. The pilot's lap and shoulder straps were intact and had not failed at their attachments, although the shoulder strap had been cut by the emergency services.

The aircraft's keel beam had fractured at the main landing gear forward fitting, due to impact forces. All other damage to the aircraft was determined to have been caused by the accident impact and a thorough examination of the aircraft did not reveal any technical defect that may have caused a loss of control.

Aircraft information

The Pegasus Quantum 15 is a tandem two-seat flex-wing microlight aircraft controlled by weight-shift. G-MZCR was powered by a 50 hp Rotax 503 two-stroke piston engine, driving a three-bladed composite propeller. The aircraft's Permit to Fly maintenance inspection had been completed on 17 August 2015, and the Permit to Fly was valid when the accident occurred. The aircraft had accumulated 279 hours since manufacture, and 4.5 hours since the last maintenance inspection. The aircraft is flown solo from the front seat and a lap strap and shoulder harness are provided for both seat occupants. Separate hand and foot throttles are provided for the pilot and it is usual for the foot throttle, mounted on the right nosewheel steering pedal, to be used for takeoff and landing.

Information provided in the aircraft manufacturer's Operator's Manual

The manufacturer provides a comprehensive Operator's Manual for the aircraft. There are a number of references to flight conditions including:

> *'Microlight flying is most enjoyable in the calm conditions found at the beginning or the end of the day, when the wind and thermals generally die away.'*

The manufacturer also provides weather limitations for wind and thermic activity (Table 1).

	EXPERIENCED	INTERMEDIATE	BEGINNER
Wind (mph)	20	10	5
Thermic activity	Moderate	Light	None
Cross wind	10	5	0
Taxiing	20	10	5

Experienced Pilots	100 + hours pilot in command
Intermediate Pilots	10 - 100 hours pilot in command
Beginners	0 - 10 solo hours pilot in command

Table 1

Wind and thermic activity limitations

Aircraft handling

Roll control in a flex-wing weight-shift microlight is achieved by the action of the pilot moving the A-frame control bar to the side away from the required direction of turn. Roll control becomes less effective at low airspeeds, so the bar needs to be pulled in slightly to increase airspeed before commencing a turn. At landing speeds a gust may catch one half of the wing leading to gust-induced rolling, requiring a corrective control input by the pilot.

Meteorology

The weather conditions were fine and warm with a westerly wind. The UK low-level significant weather chart (F215) for the region showed a slow moving cold front, from north to south,

approaching the airstrip. East Haxted Farm is located 8.5 nm to the east of London Gatwick Airport (LGW) where the METAR recorded at 1420 hrs was surface wind from 260° at 8 kt, variable between 220° and 290°, visibility more than 10 km, scattered cloud at 3,200 ft and 4,400 ft, temperature 24°C, dewpoint 18°C and pressure 1024 hPa.

The south east area ballooning forecast for 16 July 2016, valid for the period 1600 hrs to 2100 hrs, indicated weak thermal activity locally at low level up to 4,000 ft amsl.

The airstrip operator returned from his flight at 1530 hrs. He landed on Strip 6, a different runway, about 800 m to the west of Strip 4. He reported that there was thermal activity with some low level turbulence and rotor effect when he landed.

Airfield information

East Haxted Farm is situated within the LGW Control Zone and is in Class D airspace. There is a letter of agreement with National Air Traffic Service for operations at the airstrip which is operated by a small flying club group. There is a booking out logsheet for planned landings away and a notice board on which pilots should record details of local flights.

A club hangar facility with an outdoor rigging area is available; aircraft were kept in the hangar de-rigged because of limited space. Four separate grass runways are located some distance away. Strip 4 is the furthest from the hangar and is out of sight on lower ground 1 km to the south-east (see Figure 1). The strip is level, orientated 270° / 090°M, 530 m in length and 10 m wide. Trees and hedgerows are in the vicinity of the strip and a public footpath crosses around the mid-point. At the time of the accident, hay was being made in the field in which Strip 4 is sited (see Figure 2). Walkers frequently use the mown grass area as a convenient pathway.

Figure 2
View of Strip 4 from east

Pilot information

The pilot had held a Private Pilot's Licence (Microlight) since 1997. He purchased the aircraft in 1998 and had flown it regularly, mainly in the summer months. The aircraft had been kept at East Haxted since 1999. He made one flight in the aircraft in the eight months prior to the accident, a forty minute local flight on 28 May 2016.

Analysis

The investigation did not identify any pre-existing technical defect with the aircraft that could have contributed to the loss of control.

The weather conditions were warm with a surface wind of probably between 5 kt to 10 kt and some thermal activity was forecast. The airstrip environment, with the grass runway surrounded by a patchwork of grass, trees and arable land, would have created conditions likely to give rise to thermal activity at low level. This may have been exacerbated by the drying hay on either side of the runway.

The Operator's Manual warns against flying in turbulent conditions, particularly for inexperienced flyers and, although the pilot was reasonably experienced, he was not in current flying practice.

The pilot made a decision to fly in the early afternoon, a time when conditions were more likely to be turbulent; his decision may have been influenced by the fact that, as he and the airfield operator had taken the time to get the aircraft rigged and ready, he may have felt some pressure to fly. The pilot also stated that, if he had set off later in the day, this would have kept the airstrip operator waiting after returning from his own flight, to help him with the derigging of G-MZCR. The warm weather, acting on the varied terrain around the airstrip, probably gave rise to rougher air conditions than he had anticipated and he may also have underestimated the significant control forces required to fly in such thermic conditions.

Conclusion

The pilot decided to go for a flight in the early afternoon but the conditions were rougher and more turbulent than he anticipated. He experienced some thermic activity at low level during landing and decided to go around but lost directional control and was not able to prevent the aircraft from crashing into a tree.

BULLETIN CORRECTION

The description of the accident site and wreckage examination (page 39) referred to "*lift control wires*" and "*flying control wires*", terms which may cause confusion as the cables in question are structural and not specifically for control. The relevant paragraph was amended and the terms have now been replaced by '*lower side rigging cables'* and '*rigging cables'*.

The online version of this report was corrected on 12 January 2017.