

ACCIDENT

Aircraft Type and Registration:	Kolb FireFly, G-CEPN	
No & Type of Engines:	1 Fuji Robin 330 piston engine	
Year of Manufacture:	2007 (Serial no: FF05.4.00048)	
Date & Time (UTC):	20 June 2017 at 0920 hrs	
Location:	Near Newell Lane, Luffenhall, Hertfordshire	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - 1 (Fatal)	Passengers - N/A
Nature of Damage:	Aircraft destroyed	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	71 years	
Commander's Flying Experience:	5,215 hours (of which 342 were on type) Last 90 days - 0 hours Last 28 days - 0 hours	
Information Source:	AAIB Field Investigation	

Synopsis

Shortly after takeoff, approximately one mile from the runway, the aircraft was seen to enter a steep descending left turn from which it did not recover before striking the ground vertically. Analysis of CCTV footage confirmed that, immediately before the final manoeuvre, the aircraft's speed was above the predicted stall speed. The investigation was unable to identify any defect which would have prevented the aircraft from responding normally to the pilot's control inputs.

History of the flight

The pilot drove to Cottered Airfield with the aircraft on a trailer on the morning of the accident flight. There were no witnesses to his arrival at the airfield, to rigging the aircraft or taking off from the airfield. The aircraft took off from Runway 25 and after flying for less than a mile, was seen by local witnesses and on CCTV to enter a steep descending left turn and impact the ground vertically. The pilot was fatally injured.

Accident site

Police body camera footage confirmed that, when the Police arrived at the accident site, the aircraft was in a steep nose-down attitude. The emergency services had rotated the aircraft onto its landing gear prior to the arrival of the AAIB.

Recorded information

The final 4 seconds of the accident flight had been captured by a CCTV system installed on a house approximately 400 m from the accident site. The imagery showed the aircraft entering the camera's field of view for 1.5 seconds in straight and level flight.

The aircraft was then observed to roll sharply to the left and enter a steep dive from which it did not recover before striking the ground. Based on known measurements it was possible to calculate that, immediately before the initiation of the left roll, the aircraft was flying at a height of approximately 120 ft agl with a groundspeed of between 38 and 46 mph.

Aircraft details

The Kolb FireFly is a high-wing 'unregulated' ultralight/microlight aircraft. The aircraft is an American design with an open cockpit and was intended for amateur construction. The forward fuselage is mainly constructed of steel tubing, which is mated to an aluminium tail boom. The structure of the wings, horizontal stabiliser and tail fin are of aluminium tubing, covered with fabric. The wings are quick-folding for ease of storage and transportation. The FireFly is fitted with a single engine mounted between the wings which powers a pusher propeller through a belt-driven reduction gear system. The aircraft design was intended to meet the limited requirements of the 'FAR Part 103' federal regulations in the USA for 'Ultralight Aircraft', which would mean the aircraft would not need to be registered and the pilot would not require a licence.



Figure 1
Kolb FireFly

Around 2007, the CAA developed regulations, 'Single Seat De-Regulated (SSDR)', which were similar to those in the United States, allowing aircraft such as G-CEPN to operate without requiring a certificate of airworthiness or permit-to-fly. A pilot is still required to hold a licence for the class and the aircraft is registered. In 2013 this category was extended, to include all single-seat microlights within certain weight restrictions.

Since the aircraft are sold in kit form for construction by amateurs, there are no flight instruction manuals produced by the kit manufacturer. Each aircraft will perform differently due to the individual nature of the build. G-CEPN was the first FireFly imported into the UK and was test flown for a magazine article. This article listed the stall speed for the aircraft at the time of the test flight as 27 mph. This speed would be in agreement with the information published by the manufacturer which states:

'It is very responsive and light on the controls, yet is not twitchy or sensitive. The FireFly also has gentle stall characteristics. Upon entering a stall from straight and level flight, there is some sink which precedes the stall. Continuing into the stall, there will be a gentle break at about 30 mph and the nose will drop. The aircraft gains speed and resumes flying with a reduction of stick back pressure.'

Maintenance history

The aircraft had been built in 2007 and had been fitted with a Hirth F33 engine. In November 2011, after 48 flying hours, the engine had been replaced with a Fuji Robin 330. The last entry in the aircraft's log book was made in July 2013, at 199 flying hours, when the aircraft suffered an in-flight loss of the propeller and the reduction-gear system, reported in AAIB Bulletin 1/2014.

In addition to the log book, the pilot recorded aircraft maintenance activity in a note book. The last dated entry in the note book was 11 March 2017, maintenance notes continued after this entry but were not annotated with dates. The notes suggested that the pilot monitored engine and airframe performance and carried out routine maintenance tasks. A review of the pilot's log books suggests that the aircraft had accumulated approximately 370 flying hours at the time of this event.

Aircraft examination

Examination of the aircraft showed that both wings exhibited leading edge compression, the main mounting structure for the left wing had fractured during the impact and the left wing spar had fractured approximately 1 m from the wing root. The rear section of the engine mounting structure had failed and both propeller blades had shattered at approximately 30% of the blade span; the internal metal spar of one of the blades was exposed and had been bent in a direction opposite to the direction of propeller rotation. The fuel tank, which had been removed by the emergency services, was approximately 25% full of fuel. The damage to the wing mounting structure prevented confirmation of aileron control continuity on site but the continuity of the rudder and elevator controls was confirmed. It was also confirmed that all the pins and bolts used to secure the wings to the fuselage were in place and secure.

It was not possible to carry out any investigation of the aircraft's instrumentation due to impact damage. Examination of the aileron control circuit confirmed that it had been correctly rigged but the universal joint within the control circuit had fractured and the centre block was missing, Figure 2.

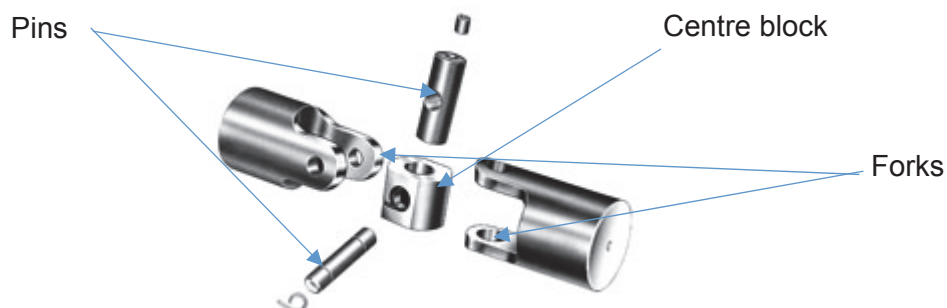


Figure 2

Example of a universal joint

Evidence of mechanical damage and deformation of the joint forks and pin locating holes was observed on the remaining sections of the joint, showing that the centre block was in place at the time of the impact with the ground.

Examination of the left wing spar failure and the fuselage wing and engine mounting structure confirmed that all the failures were as a result of structural overload. The engine was disassembled and no evidence of a defect or failure was identified. Inspection of the carburettors confirmed that fuel was present in the carburettor bowls and there was no evidence of a defect which would have prevented normal operation.

Meteorology

Luton Airport lies 13 nm south west of Cottered Airfield, and Stansted Airport lies 13 nm south east. Both were reporting light easterly winds, with no cloud, good visibility and a temperature of 24°C.

Airfield information

Cottered Airfield is a 500 m grass strip on a farm. The pilot was familiar with the airfield and the local area. He stored his aircraft at home, rigging and de-rigging each time at the airfield.

Pilot information

The pilot had been flying microlight aircraft for many years and had extensive experience on a number of different types. Up to the flight of 20 June 2017 he had not flown for some months, due to technical issues with the aircraft as well as personal reasons. As his class rating for microlights had been issued prior to 1 February 2008, he was not required to have any flights with an instructor to renew his rating by experience. There was no record of him having flown any dual flights since he received his licence in 1990.

A post-mortem examination was carried out on the pilot by a pathologist. It reported no evidence of underlying disease and concluded that the pilot had died from multiple injuries. Toxicology tests revealed no evidence of any substance that could have contributed to the event.

Analysis

With no witnesses to the arrival of the pilot at the airfield, his rigging or takeoff, it was not possible to establish the pilot's intentions for this flight. He appears not to have flown for over six months, so he was out of recent flying practice, but it is not known whether this was a factor in the event.

There was no evidence of a pre-impact failure of the aircraft's structure and there was no evidence of a defect within the engine which would have prevented its normal operation. The damage to the propeller blades was consistent with them hitting the ground whilst rotating under power.

The damage observed to the universal joint within the aileron control circuit was consistent with the joint being correctly connected at impact. No defects were observed within the aircraft's controls which would have prevented the aircraft responding to the pilot's control inputs and there was no evidence of an in-flight structural failure.

Conclusion

The investigation did not find any evidence of a defect with the aircraft which would have prevented the aircraft responding to control inputs. The pathology did not indicate that the pilot had suffered an incapacitation and although he had not flown recently it is not known if this lack of recent experience was a factor in this event.

Analysis of the CCTV imagery showed that, immediately before the final manoeuvre, the aircraft was flying at an airspeed greater than its predicted stalling speed. It is highly unlikely, therefore, that a stall or spin entry was a factor in this event.

It is therefore not known why the aircraft departed from what appeared, from the CCTV imagery, to be level and controlled flight.