

No: 12/89

Ref: EW/C1127

Category: 3

Aircraft Type and Registration: Aerial Arts Ltd Chaser S microlight, G-MVLV

No & Type of Engines: 1 Rotax 377 piston engine

Year of Manufacture: 1989

Date and Time (UTC): 19 July 1989 at 1852 hrs

Location: In the sea off Hayling Island, Hampshire

Type of Flight: Private (training)

Persons on Board: Crew - 1 Passengers - None

Injuries: Crew - 1 (fatal) Passengers - N/A

Nature of Damage: Aircraft destroyed

Commander's Licence: Student pilot

Commander's Age: 30 years

Commander's Total Flying Experience: 8 hours (of which 1 was on type)

Information Source: AAIB Field Investigation

The pilot, who had considerable experience on hang gliders, was undergoing a course of training on microlight aircraft. Following 7 hours dual in a Pegasus microlight aircraft, he completed 45 minutes solo in the single seat Chaser S, which he owned. On the evening of the 19 July 1989 he was briefed by his instructor for a solo general handling exercise in the local area. The weather was fine and the wind was virtually calm.

At about 1845 hrs the aircraft took-off from a field at Manor Farm, Del Quay, West Sussex and flew down the Chichester channel to the mouth of the harbour. It then reversed course and headed back towards the channel. At about 1851 hrs, when it was opposite the lifeboat station on the east coast of Hayling Island, it was seen to "rock" slightly, fly steadily for 2 to 3 seconds and then rock again. It then entered a spiral dive, the engine noise stopped and one of the wings folded at its mid-position. The tide was out, and the aircraft struck the sea on the Sussex side of the channel. Although a lifeboat and rescue helicopter were promptly on the scene, divers were unable to recover the body until 1932 hrs. The post mortem report indicated that the pilot, who was wearing a protective helmet, was rendered unconscious by the impact with the water and subsequently drowned.

Examination of the wreckage revealed that the structural components of the left wing had failed in a

downwards bending direction, and in an upwards direction on the right wing. The cross tube had failed in upwards bending at the central hinge point. All rigging wires were intact except for the cross-tube restraining wire on the left side, which had failed as a consequence of having been stretched tightly around the king post attachment fitting at the keel, consistent with the keel tube having been forced to the left relative to the cross tube. The pilot's control bar had fractured close to the left hand end.

All failures of the wing structure had occurred as a result of overload during the period of uncontrolled flight or of impact with the water. The damage to the trike unit was consistent with it having struck the water on its right side. No evidence of any pre-impact defect was found associated with the structural framework of the wing or the trike unit.

The engine and carburettor had filled with sea water and the fuel tank also contained water. The carburettor was knocked off its rubber coupling to the engine cylinder head and the air cleaner was missing. The engine support frame was intact but there were bruises on the engine anti-vibration mounts, indicative of heavy engine vibration prior to impact. With this exception, all damage to the engine was consistent with the impact and no evidence was found to suggest that the engine had been malfunctioning prior to the loss of control.

Detailed examination of the wing fabric revealed evidence of general tearing consistent with the impact, but there was also a region of pre-impact tearing on the right wing. The pre-impact tears began at the trailing edge, approximately 3ft outboard from the keel, and extended forwards approximately three quarters of the way across the wing.

A series of strike marks and bruises were found on the lower surface of the right wing, near the trailing edge, in the area of the pre-impact tears. The mylar plastic reinforcing strip at the trailing edge was damaged, consistent with the lower wing surface having been struck by objects which had considerable energy. Examination of the fabric fibres adjoining these strikes confirmed that the pre-impact tears in the fabric propagated as a result of the damage caused by the strikes.

Investigation of the geometry of the strike marks using an intact aircraft, showed that the objects which struck the wing had originated from the upper region of the propeller disc, consistent with the release (under centrifugal loading) of fragments of propeller blade. A small sample of fabric from the wing in the region of the strike marks and a sample of the propeller varnish were subjected to mass spectrographic analysis. The results of this analysis confirmed that the wing strike marks had been produced by pieces of the propeller; the bruising of the engine anti-vibration mountings was consistent with these pieces of blade having separated from the propeller in flight.

The effect of the wing tearing in flight would have been to produce an immediate loss of lift from the right wing, causing an uncontrollable roll to the right accompanied by a pitch up, together with a sudden loss of spanwise sail tension. The resulting movement of the sail fabric towards the left wing tip would have wrenched the keel tube to the left relative to the cross tube, in turn stretching the cross tube restraint wire tightly around the kingpost attachment fitting, thus producing the overload failure of the

restraining wire found in the wreckage. Once the sail tear had occurred, control of the aircraft would have been irretrievably lost.

Extensive work was carried out in an attempt to identify the cause of the propeller breakup. Objects such as the pilots visor, glasses or gloves, which could have been released accidentally into the propeller were recovered with the wreckage and the small tools and other items normally carried in the trike fairing were found still in their stowage. The pilot's map was also accounted for.

Examination of the recovered propeller pieces has not revealed the presence of any significant defects in the wood, nor in the bonding. Widespread staining was evident on the fracture surfaces of one of the blades and there were other features present which are sometimes associated with pre-existing cracks. However, despite extensive chemical analysis it has not been possible to establish the cause of the staining, nor its significance to the propeller failure.