

No: 8/92 **Ref:** EW/C92/5/1 **Category:** 3

Aircraft Type and Registration: Pegasus XL-Q, G-MVCU

No & Type of Engines: 1 Rotax 462 piston engine

Year of Manufacture: 1988

Date & Time (UTC): 4 May 1992 at about 1522 hrs

Location: Sunken Island, West Mersea, Essex

Type of Flight: Private

Persons on Board: Crew - 1 Passengers - 1

Injuries: Crew - Fatal Passengers - Fatal

Nature of Damage: Aircraft destroyed

Commander's Licence: Private Pilot's Licence

Commander's Age: 33 years

Commander's Flying Experience: 62 hours (all of which were on similar types)
Last 90 days - 10 hours
Last 28 days - 6 hours

Information Source: AAIB Field Investigation

At about 1510 hrs on 4 May 1992 the microlight aircraft took off for a local flight from a private field near Tolleshunt D'Arcy, Essex. The pilot and a 16 year old male passenger were on board. It was not possible to determine the aircraft's precise flight path after take-off, however, several eye-witnesses in the West Mersea area observed it over land carrying out tight turns, steep climbing manoeuvres and apparent whipstalls. Shortly after passing over the shore line and when heading towards the estuary, the aircraft suffered a catastrophic in-flight structural failure. The wing separated from the structure and the trike, with the pilot and passenger held into it by their restraint harnesses, fell almost vertically to the ground from a height of several hundred feet. Both occupants died instantaneously in an impact that was non-survivable.

Examination of the wreckage showed that the wing and trike unit had fallen to earth separately and were about 400 metres apart. The wing had landed just inside the water line and was not excessively damaged. The trike had fallen into the estuary and was extensively damaged and partly submerged in thick mud. The area where the trike unit fell, known as "Sunken Island", is a tidal area and the

wreckage was submerged at each high tide. This had allowed extensive corrosion to occur which precluded a full investigation of some of the engine components.

The trike unit had broken away from the wing at the monopole and front strut, also breaking the safety cable in the monopole. This had occurred under conditions of excessive negative "g" loading although there was also some evidence in the monopole fracture that the final separation occurred when this negative load was reversed. Both wing tips had failed in downward bending, which suggests significant negative "g" loads. There was no evidence of the propeller striking the adjacent cables, nor any clear evidence that it had struck the keel. The front strut had failed near the point where the "A" frame control bar would have contacted it, however there were no witness marks on either the bar or the strut to suggest that forcible contact had occurred in flight. Even so, there were many indications in the wing detail parts that high positive and negative loadings had been sustained prior to the in-flight break up. These loadings were assessed by the manufacturer as being possibly as high as 3 "g" negative and near to ultimate failure in positive loading. There was no evidence of any pre-existing failure or aircraft defect which might have caused control problems.

The failure of the safety cable occurred at the base of the monopole. Although the primary purpose of the cable is to prevent catastrophic separation of the monopole arising from fatigue damage this presumes that the other structure will remain undamaged in which case control of the aircraft should be possible. However, the manufacturer is reviewing the cable attachment in this area since this had allowed the final separation to occur.

The engine and propeller were examined particularly as the manufacturer advised that large variations in engine power could affect the attitude of the aircraft during recovery from some manoeuvres. The wooden propeller was broken up and the spread of parts on the ground showed that this had happened in the air. The damage to the propeller was indicative of rotation but with little or no engine power being applied. The engine and reduction gear were examined and large quantities of mud were found in the cylinders, however apart from this the engine and gear drive appeared normal. Fuel was found in the in-line fuel filter, but the carburettor, which had been broken off, contained no fuel and was contaminated with mud and water. The fuel tank contained a small quantity of fuel but it had been damaged and submerged so that no assessment of quantity or cleanliness could be made. The ignition system was examined visually and appeared to be in order but could not be tested due to impact damage and corrosion. There was no evidence that the engine had malfunctioned in any way.

The flight limitations that pilots should observe are included in the aircraft "Operators Handbook" and are also placarded on the aircraft structure. The limitations stipulate that pilots should not pitch the aircraft nose down or nose up more than 30° from the horizontal or exceed 60° angle of bank. The

aircraft is non aerobatic and manoeuvres such as whipstalls, wingovers, tailslides, loops, rolls or spins are prohibited. It is recommended that positive "g" loading should be maintained at all times in flight and that negative "g" should never be applied. The structural damage to the airframe was such to suggest that some of these limitations had been exceeded on the accident flight.