

## Pegasus Flash, G-MNKS

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| <b>AAIB Bulletin No: 8/2004</b>        | <b>Ref: EW/C2003/11/17</b>                      | <b>Category: 1.4</b> |
| <b>Aircraft Type and Registration:</b> | Pegasus Flash, G-MNKS                           |                      |
| <b>No &amp; Type of Engines:</b>       | 1 Rotax 447 piston engine                       |                      |
| <b>Year of Manufacture:</b>            | 1986  |                      |
| <b>Date &amp; Time (UTC):</b>          | 23 November 2003 at 1210 hrs                    |                      |
| <b>Location:</b>                       | In a field at Halsall near Ormskirk, Lancashire |                      |
| <b>Type of Flight:</b>                 | Private   |                      |
| <b>Persons on Board:</b>               | Crew - 1  | Passengers - None    |
| <b>Injuries:</b>                       | Crew - 1 (Serious)                              | Passengers - N/A     |
| <b>Nature of Damage:</b>               | Extensive wing and pylon damage                 |                      |
| <b>Commander's Licence:</b>            | Student Pilot                                   |                      |
| <b>Commander's Age:</b>                | 42 years  |                      |
| <b>Commander's Flying Experience:</b>  | 22 hours<br>(of which 2 were on type)           |                      |
|  | Last 90 days - 6 hours                          |                      |
|  | Last 28 days - 2 hours                          |                      |
| <b>Information Source:</b>             | AAIB Field Investigation                        |                      |

### History of the flight

The pilot was returning to his home airfield of Ince Blundel at approximately 2,000 feet agl when the engine revolutions dropped rapidly from 5,200 RPM to 3,800 RPM. The engine continued to run smoothly at this RPM but would not accelerate. There was insufficient power to maintain level flight and believing that he was unable to make his home base, the pilot selected a large field with no obstructions to make a forced landing. Although he was able to position to land into wind in the centre of the field, he had been unable to ascertain the surface condition. On touchdown the nosewheel dug into the surface, which was extremely wet from recent heavy rain, and the aircraft pitched inverted rendering the pilot unconscious. Nearby witnesses alerted the rescue services that freed the pilot and took him to hospital.

The weather at the time of the power loss indicated a temperature of +3°C and a dew point of +1°C giving a relative humidity of 87%.

### Engine Examination

The engine, a two stroke, air cooled, twin cylinder Rotax 447, had completed 521.8 hrs since 1986 when it had been fitted to this aircraft. A full engine strip and rebuild had been carried out in October

2003 following an engine seizure and resultant forced landing. The engine had operated 2.5 hrs since this incident.

The engine was taken to the manufacturer's UK agent for testing under AAIB supervision. It started without difficulty, ran up to maximum power (6,450 RPM), and operated for period of ten minutes at around cruise power (5,675 RPM). There were some minor fluctuations in RPM (down to 5,160 RPM), however, the engine performed satisfactorily within normal operating limits.

The fuel pressure was checked using a fuel pressure gauge in the fuel line between the fuel pump and the carburettor. A fuel flow check measured the quantity of fuel delivered as 150 cc/min; the engine requirement at full power is for 83 cc/min. The fuel filter was removed and no debris was found. It was noted however, that the filter fitted was a paper type filter. This is no longer recommended for fitment in the service information provided by the manufacturer.

The carburettor was disassembled. Although wear was evident on some components, no failure was identified. Premature wear on carburettor parts can cause engine failure and a manufacturer's Service Information leaflet (8 UL 91-E dated June 1991) introduced a 50 hour safety check. Vibration can cause the jet needle to rotate in its locating circlip, eventually wearing a groove, that potentially could lead to the failure of the needle.

The resistance of the two ignition coils and the ignition timing were checked and found to be satisfactory. The spark plugs had been damaged in the accident but minor repairs to them did allow the engine to run. It was noted however that the spark plugs were a 'screw-on' top design. Engine vibration has been known to cause the spring clip inside the plug cap to produce wear in the aluminium plug top, resulting in a fine aluminium dust being deposited inside the plug cap. This can lead eventually to the spark tracking down inside the plug cap, earthing the metal shield and causing the engine to misfire. The manufacturer published a Safety Bulletin in September 1987 stating that a number of engine misfires had been attributed to this cause and recommended that the plug cap should be thoroughly cleaned and the aluminium top spark plugs be replaced with a fixed steel top type (as fitted by the manufacturer).

## **Discussion**

The overall condition of the engine was commensurate with its age but, despite the issues noted in the examination, no specific cause for the loss of power on the accident flight could be identified. Information, published in the CAA's General Aviation Safety Sense Leaflet titled '*Winter Flying*', indicates that, in the weather conditions present at the time of the power loss, there was a possibility of serious carburettor icing occurring at any power setting. Carburettor icing normally leads period of gradual power loss followed by rough running. The symptoms observed by the pilot, however, would suggest that the engine was running on only one cylinder. The condition of the rear spark plug indicated that it had been running with a richer mixture and it is therefore likely that this was the inoperative cylinder.