

Magneto earth lead found broken on a single magneto assembly.

Taken from AAIU report No 2001-001

A Pegasus XL-R microlight aircraft was on a flight in the Drogheda area when the pilot experienced engine power drop and was forced to crash land on Baltray beach both occupants were hurt. A two cylinder, 2-stroke cycle Rotax 447 engine, powers the Pegasus XL-R. The engine is equipped with one spark plug in each cylinder. A single magneto assembly powers the spark plugs. Within this assembly are two coils, each coil provides ignition to one spark plug. The report said the engine was found to be in good condition and did not appear to have been damaged in the accident. However, the earth lead to one of the magneto coils was found to be broken. The brass connection tab at the end of the lead was broken. The location of this lead is such that it is well protected and it is unlikely that the tab was damaged in the accident or subsequently. The broken connection tab was subjected to detailed metallurgical examination with the following results.

- Failure of the connection occurred over a period of time, through the propagation of a fatigue crack, to the point that the small remaining intact ligament failed through overload.
- The examination did not reveal any indication of a material or manufacturing defect associated with the fracture.
- There was no indication of arcing associated with the fracture. This would indicate that the separation of the connector was sudden and total.

The report said failure of the earth connection of the magneto coil would result in the sudden and total failure of the spark to one of the two engine cylinders. This in turn would lead to a power loss to the propeller exceeding 50%. Standard aircraft engines feature two totally separate magneto systems, each with its own spark plug in each cylinder. This is known as dual ignition. With such a system, the loss of one complete magneto system, or any component of that system, results in a relatively minor loss of power, thereby permitting a safe landing in the event of the failure of one ignition system. The single ignition system on the Rotax 447 engine has no such safety protection. Therefore such aircraft should be operated in a manner whereby an engine failure cannot be considered a remote possibility, but rather as a distinct probability. Consequently manoeuvres such as low runs, which would require normal engine power to be available for a safe recovery, should not be attempted in aircraft equipped with such engines. Such aircraft should be flown in manner that, following an engine failure at any time, the flight can be safely completed using a glide (powerless) landing.

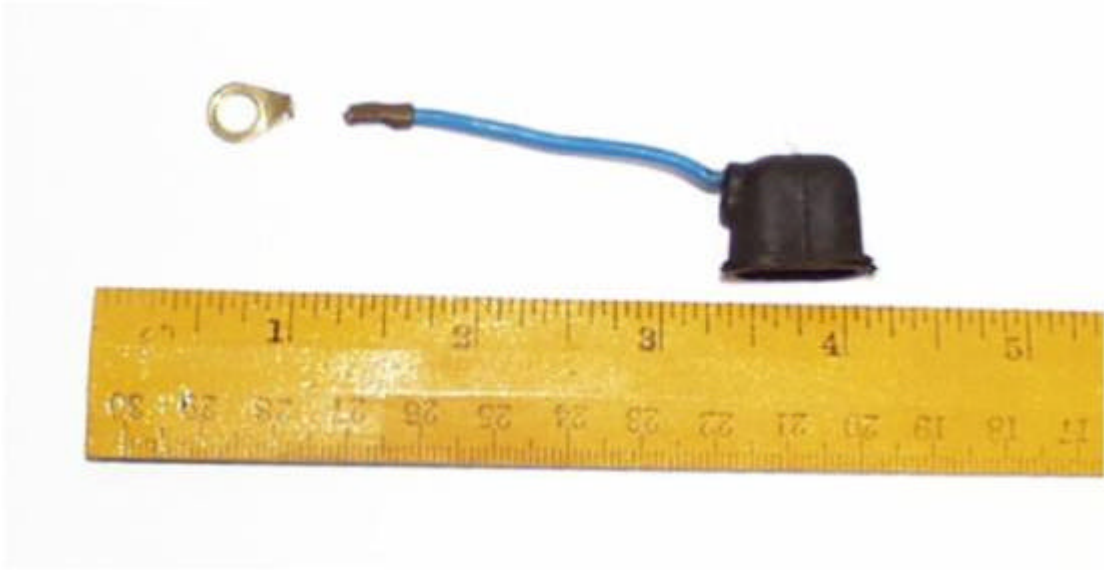


Fig 1

The failed magneto lead showing the separated tab to the left of picture