

Europa, G-BWGH

AAIB Bulletin No: 9/2002	Ref: EW/C2001/10/01	Category: 1.3
Aircraft Type and Registration:	Europa, G-BWGH	
No & Type of Engines:	1 Rotax 912-UL piston engine	
Year of Manufacture:	1997	
Date & Time (UTC):	13 October 2001 at 1347 hrs	
Location:	Little Sark - Island of Sark	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - None	Passengers - None
Nature of Damage:	Engine, propeller, undercarriage, port wing, fuselage and tailplane	
Commander's Licence:	Private Pilots Licence	
Commander's Age:	44 years	
Commander's Flying Experience:	375 hours (of which 26 were on type)	
	Last 90 days - 30 hours	
	Last 28 days - 9 hours	
Information Source:	AAIB Field Investigation	

History of the flight

The aircraft, flown by one of the co-owners, was on its final flight of a nine-day tour of northern France. During the nine days, the pilot had checked the engine oil level before each flight and noticed that it was using relatively little oil. Prior to this flight from Jersey to Exeter, a thorough pre-flight inspection was carried out and the aircraft found to be serviceable. After refuelling, the aircraft was taxied to the holding point and engine power checks carried out. All the pressure and temperature gauges were reading within limits. The pilot and passenger were both wearing immersion suits and lifejackets.

The aircraft departed Jersey and commenced climbing to Flight Level 50. Upon reaching approximately 2,600 feet altitude the pilot was aware of a hot smell and noticed that the engine oil

pressure had fallen to zero. He informed ATC of the problem and reported the aircraft's position which was about midway between Jersey and Guernsey. The engine then began to run roughly and after about 30 seconds, it stopped. The pilot made a 'Mayday' transmission declaring his intention to try and reach the island of Sark approximately 3 miles away but ATC suggested he should head towards Guernsey where there were more suitable landing sites. The pilot assessed that ditching in the sea at that time of the year was unwise if land could be reached and although aware of the 'no fly' zone around the island, he decided to head towards Sark. Having reached Little Sark (an isthmus forming the southern part of the island of Sark), at about 800 feet amsl, the pilot became aware that all the fields were very small. About two miles in the distance he could see the main island of Sark where the fields appeared slightly larger but because of the low height of the aircraft, he felt that it was not safe to attempt a landing on the main island. There were no beaches visible on Sark so he decided to force land in a small field below the aircraft.

Both the pilot and his passenger were experienced microlight pilots used to landing in small fields. The pilot selected full flap, switched off the aircraft's fuel and electrical systems and initiated a diving turn, maintaining the airspeed at 75 kt. The approach was made into wind at about 60 kt and aligned with the diagonal of the field. The aircraft was purposely landed heavily in an attempt to remove as much forward momentum as possible. The pilot then aimed the aircraft at the top left-hand corner of the field so that the left wing would obliquely impact a bank that formed the left edge of the field. This caused the aircraft to ground loop forcing the tail into the bank at the far end of the field. The tail absorbed the majority of the impact forces. The pilot and his passenger stepped out of the wreckage unhurt. The pilot contacted ATC using a hand held radio to inform them that no one had been injured.

Observations

The wreckage was recovered from Sark to Guernsey where the AAIB examined the engine and its systems. It was discovered that there was no oil within the engine which had seized. Further examination revealed that the forward right-hand cylinder rocker cover (Figure 1) (*jpg 18kb*) was loose. This had allowed the engine oil to drain overboard whilst the engine was running. Further examination showed that the single steel screw that attached the rocker cover to the aluminium alloy cylinder head (Figures 3 (*jpg 134kb*) & 4 (*jpg 95kb*)) had stripped the threads within the cylinder head (Figure 2) (*jpg 171kb*). A check was carried out on the other three rocker cover attachment screws and they were found to be torqued to 9, 12 and 14 Newton-metres (Nm). The engine manufacturer's torque requirement for the rocker cover attachment screws was 10 Nm.

Examination of the airframe and engine log books showed that the engine rocker covers had been removed and refitted in May 2001 by the engine manufacturer's approved overhaul organisation within the United Kingdom as part of the work involved in carrying out manufacturer's Service Bulletin 7UL96. There were no entries to indicate that the rocker covers had been disturbed since the Service Bulletin was carried out.

It was initially thought that the rocker cover screw had probably been over-torqued thus causing the damage to the aluminium threads in the cylinder head. However, a small sample of tests carried out by the AAIB and by a UK Rotax engine distributor revealed that when the screw was over-torqued beyond the recommended 10 Nm, the screw failed in tension (between 12 and 17 Nm) without damaging the aluminium threads of the hole. On recent engines, Rotax have changed to a stronger screw but when this type of screw was over-torqued, it also failed before the aluminium threads were damaged (at between 17 and 21 Nm).

It is evident that the stripped aluminium threads within the cylinder head lead to the engine's oil loss and subsequent engine seizure. However, there was insufficient evidence to determine the cause of the stripped threads.