

ACCIDENT

Aircraft Type and Registration:	Europa, G-TAGR	
No & type of Engines:	1 Rotax 912 ULS piston engine	
Year of Manufacture:	2004	
Date & Time (UTC):	21 July 2006 at 1305 hrs	
Location:	1.5 miles West of RAF Syerston, Nottinghamshire	
Type of Flight:	Private	
Persons on Board:	Crew 1	Passengers 1
Injuries:	Crew None	Passengers None
Nature of Damage:	Nose landing gear collapse and significant damage to lower fuselage and wing mounts	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	57 years	
Commander's Flying Experience:	394 hours (of which 29 were on type) Last 90 days - 5 hours Last 28 days - 1 hour	
Information Source:	Aircraft Accident Report Form submitted by the pilot/owner and subsequent testing	

Synopsis

Shortly after taking off from RAF Syerston the pilot noticed that the engine was not running at maximum speed and, as the aircraft climbed through 200 ft, it began running roughly with its speed decreasing. The pilot reduced the power setting, which resulted in the engine running smoothly for a short while, but when increased power was demanded to initiate a climb and return to RAF Syerston, the engine again began to run roughly and failed to respond to throttle inputs. The pilot carried out a forced landing in a crop field which resulted in the collapse of the nose landing gear and damage to the lower fuselage and wing mounts. In the absence of any identifiable technical defect, it was considered that fuel

vapour locking, caused by the use of un-insulated fuel lines within the engine compartment, had caused the loss of power.

History of the flight

The pilot/owner had planned to fly with a friend to Waterford, via Swansea. As the aircraft would need to operate close to its maximum all up weight, the pilot positioned the aircraft to RAF Syerston on the previous evening to make use of the longer runway. This flight lasted for approximately 1.5 hours and, apart from a short period of 'rough running' when climbing through 2,500 ft, the flight was uneventful. On the

day of the accident, the engine started normally and no abnormalities were observed during the pre-takeoff power checks. Some 15 minutes later, the takeoff was commenced and, initially, appeared normal. Shortly after rotation, the pilot noticed that the engine was only producing 5,100 rpm instead of the expected maximum of 5,500 rpm but, as it was running smoothly and the aircraft was climbing at 500 fpm, he decided to continue with a gentle climb to allow the airspeed to build up. After passing 200 ft, the engine began to misfire and its speed decreased below 4,800 rpm. The pilot reduced the power setting to see if the misfiring could be corrected. At 4,000 rpm, the engine ran smoothly and, with 15° of flap set, the aircraft was able to maintain its altitude. The pilot then slowly increased the engine power setting and attempted to climb, with the intention of carrying out a wide circuit and returning to RAF Syerston. However, the engine failed to respond and began to misfire severely. As the aircraft was now descending through 200 ft the pilot turned 'in to wind' and identified a suitable field for a forced landing. While concentrating on maintaining flying speed the pilot misjudged the final stages of the approach and landed heavily with the aircraft in a slightly nose down attitude. This, together with a pronounced upslope of the landing field, resulted in the nose landing gear failing and the aircraft's nose and propeller striking the ground. Both occupants were uninjured and able to leave the aircraft unaided.

Investigation

The pilot had built the aircraft in 2004 from a kit and installed an engine supplied by the airframe manufacturer. The engine had run for 51 hours prior to the incident and had been maintained by Rotax approved engineers since its installation.

An aftercast provided by the Met Office showed that, although the air temperature was 29°C, the humidity was

relatively high and therefore there was a possibility of carburettor icing at low power settings. Before taking off, the aircraft had been on the ground with the engine running for approximately 15 minutes, presumably at both low and high power settings, with the attendant risk that some carburettor ice could have formed whilst running at low power. Although the initial part of the takeoff at high power was apparently normal, the possibility that ice could have built upon that already in the induction system could not be fully discounted.

The fuel tank on a Europa has two lobes on its lower side to allow it to sit over the rear portion of the fuselage landing gear bay, which is used in the mono-wheel variant of the aircraft. Fuel is then pumped from each lobe, on selection, to the engine by both an electrical and mechanical fuel pump. At the time of the accident fuel was being supplied by the left side of the tank. Tests carried out by the owner after the incident confirmed that, although some debris was found in the fuel filter associated with the left lobe, the supply from each side of the tank was over twice the engine's maximum fuel consumption rate. The tests also confirmed that the fuel return line was free from obstruction. An inspection of the ignition system showed all cables to be free from cracking and visible damage.

Photographs provided by the owner show that the fuel lines to and from the mechanical fuel pump were routed over the right inlet manifold, Figure 1; this complies with the recommended routing in the manufacturer's build manual. The manual also recommends that these lines are provided with an insulating sleeve to prevent heat transfer into the fuel. This recommendation was introduced¹ by the kit manufacturer as a result of several

Footnote

¹ Europa Aircraft Service Bulletin No 1 of June 1997

cases of fuel vapour lock occurring during takeoff, which manifested itself as rough running and engine stoppage. The fuel lines fitted to G-TAGR were un-insulated and constructed with braided steel reinforcement.

Given the use of un-insulated fuel lines in an area of the engine bay which would be subject to significant heat

build up, and the high ambient temperature on the day, the possibility that the engine's rough running and power loss was caused by a vapour lock, which interrupted the flow of fuel to the engine, also could not be dismissed.



Figure 1