

ACCIDENT

Aircraft Type and Registration:	Flight Design CTSW, G-CETF	
No & Type of Engines:	1 Rotax 912ULS piston engine	
Year of Manufacture:	2007 (Serial no: 8318)	
Date & Time (UTC):	2 August 2015 at 1530 hrs	
Location:	Near Boston, Lincolnshire	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - None	Passengers - None
Nature of Damage:	Damage to landing gear, propeller, engine covers, tailplane, rudder, plus extensive airframe damage	
Commander's Licence:	National Private Pilot's Licence	
Commander's Age:	65 years	
Commander's Flying Experience:	161 hours (of which 62 were on type) Last 90 days - 32 hours Last 28 days - 9 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Summary

Whilst on final approach the engine suddenly lost power and the pilot was forced to land in a field short of the runway threshold. The aircraft nosed over and came to rest inverted. The investigation was inconclusive concerning the engine power loss, although fuel starvation was a possible cause.

Accident details

Following an uneventful flight to Cromer, Norfolk, the aircraft was returning to the pilot's home airfield at Boston Aerodrome, Lincolnshire. After joining overhead at 2,000 ft, the pilot descended on the 'dead side' of the airfield and joined the circuit at 1,000 ft agl for Runway 09. On the downwind leg he checked the engine temperatures and pressures, and noted that fuel was visible in the sight tubes in the wing roots (there are no conventional fuel gauges on this aircraft type). 30° flap was selected on turning onto base leg. After turning onto final approach, the aircraft experienced sink, so the pilot applied more power. As he did so the engine suddenly stopped; he attempted a restart but was unsuccessful. There was insufficient height to glide to the runway and the pilot was forced to land the aircraft in a field of unharvested corn short of the 09 threshold. The aircraft nosed over and came to rest inverted; however both occupants were uninjured and escaped unaided.

Description of aircraft fuel system

The CTSW is a high-wing aircraft with integral fuel tanks in the inboard sections of the wings. Each tank has a capacity of 65 litres and a circular plug in each wing root incorporates a fuel contents sight tube.

The wings have a 1.5° dihedral angle, which, in balanced flight, tends to assist in keeping the fuel towards the inboard ends of the tanks. According to the aircraft manufacturer's Aircraft Operating Manual, the unusable fuel is 3 litres per tank. The same manual gives the fuel consumption as 25 litres/hour at maximum continuous power (5,500 rpm) and 18.5 litres/hour at 75% power, a typical cruise setting.

The fuel off-take is located close to the sight tube, towards the rear of the tank, and consists of an inlet strainer attached to a short length of rigid tube that holds the strainer close to the tank floor; there is no sump in the floor that would keep the inlet strainer immersed in fuel. The outlets of the left and right tanks are joined together in the fuselage, immediately upstream of a simple ON/OFF fuel selector. Thus, an ON selection will result in fuel being drawn simultaneously from both tanks. This arrangement, which applied to UK registered aircraft only, superseded an earlier design in which the fuel was selectable from either the left or right tank only, not both. The modified design was implemented by means of Service Bulletin (SB) CT125 and was mandated by the UK Civil Aviation Authority (CAA). Information in the SB noted that: *'after the modification, the fuel should feed reasonably evenly from both tanks. Imbalance in flight can be corrected by flying with a little sideslip for a while.'*

The investigation

The pilot later reported that, with assistance, he was able to return the aircraft back onto its wheels, although damage to the right main landing gear resulted in a right-wing-low attitude. The aircraft was recovered a couple of days later, by which time virtually all the fuel had transferred into the right tank. The pilot stated that he drained the fuel from the aircraft and obtained 22 litres, all but a couple of litres from the right tank. He was confident that no fuel had escaped whilst the aircraft lay in its inverted attitude.

Examination of the aircraft, by both an insurance loss adjustor and a potential repair organisation, found no fault that could explain the power loss. In particular, no mechanical failure had occurred within the engine.

The pilot subsequently commented that, in his experience with this aircraft, the left tank always emptied before the right. This accords with other pilots' experiences of sometimes considerable fuel imbalances occurring in flight, as discussed on internet forums for this aircraft type. The pilot of the subject aircraft noted that his "overhead join" and circuit entry involved five turns to the left, with the power loss occurring after he applied a little right bank, as he aligned the aircraft with the runway. He considered that it may have been possible that his manoeuvres resulted in one of the fuel off-takes to have become temporarily uncovered, such that air was ingested into the fuel system. It is worth noting that flap selection tends to cause the aircraft to pitch down, which would tend to cause the fuel to move forward

in the tanks, away from the off-takes. Nevertheless, during the downwind checks, fuel was observed in both sight tubes, which suggested adequate quantities were available to the engine at that stage, although it was not possible to determine how the approximately 22 litres of fuel were distributed between the tanks.

Other reasons for the power loss could include carburettor icing, although the pilot observed that aircraft equipped with the same engine type were operating from the airfield that day, without apparent problems.

Thus, from the available information it was not possible to arrive at a conclusion as to the cause of the engine power loss.