

ACCIDENT

Aircraft Type and Registration:	Cessna 152, G-BWEV	
No & Type of Engines:	1 Lycoming O-235-L2C piston engine	
Year of Manufacture:	1979	
Date & Time (UTC):	2 May 2007 at 1230 hrs	
Location:	Sandon, Chelmsford, Essex	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	Damage to both wing leading edges, propeller, engine cowling and left door	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	60 years	
Commander's Flying Experience:	304 hours (of which 57 were on type) Last 90 days - 6 hours Last 28 days - 4 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot and further enquires by the AAIB	

Synopsis

On a flight to Andrewsfield Airfield, Essex, from Shoreham Airport, Sussex, the aircraft's engine faltered and then stopped. The pilot carried out a forced landing in a field and the aircraft collided with a hedge. The aircraft had run out of fuel.

Background information

On the morning of the accident, the aircraft's fuel tanks were filled to a total of 80 litres. G-BWEV was then flown on a one hour instructional flight from its home base of Andrewsfield. The pilot of the accident flight did not fly this detail but was aware of its duration. Using commercially available software, he planned a flight to

Shoreham and a return to Andrewsfield on his computer. The calculated fuel burn from Shoreham to Andrewsfield was 19 litres.

History of the flight

The pilot stated that prior to departing Andrewsfield, he dipped the aircraft's fuel tanks as he considered the aircraft's fuel gauges to be inaccurate. He measured 30 litres in the left tank and 40 litres in the right. The weather was CAVOK with a wind of 070°/15 kt at 3,000 ft amsl. The flight to Shoreham lasted 55 minutes and was uneventful.

At Shoreham the pilot dipped the fuel tanks again and measured 20 litres in the left fuel tank and 30 litres in the right. He estimated (using a fuel burn of 25 litres/hr) that this would give the aircraft an endurance of 2 hours. The pilot took off at 1135 hrs and cruised at 3,000 ft amsl, 90-95 kt and with a power setting of 2,200 rpm. At 1230 hrs, when 11 nm south-east of Andrewsfield, the pilot requested the current airfield information. About three minutes later the aircraft's engine began to falter. He selected carburettor heat ON, mixture fully rich and applied full throttle but the engine continued to falter. The left fuel gauge was "flickering" around empty and the right was indicating approximately $\frac{1}{4}$ full (18 litres). Suspecting fuel starvation, the pilot decided to make a forced landing and informed Andrewsfield of his intention. Shortly afterwards, the engine stopped.

The pilot's initial choice of field was not achievable so he chose a closer but smaller one. The aircraft touched down at approximately 60 kt with no flap selected. Realising he would not be able to stop the aircraft before the boundary hedge, he steered it through a gap into the adjacent field. The aircraft eventually stopped in a hedge on the far side of this second field. Before shutting the aircraft down, the pilot transmitted to an airborne aircraft that he was uninjured and was vacating the aircraft.

The Andrewsfield Airfield manager and an engineer from the maintenance organisation attended the accident site. On inspection, they found no fuel in the right tank and 10 litres in the left tank.

Fuel planning

G-BWEV was fitted with long range fuel tanks. This gave it a fuel capacity of 147 litres of which 5.5 litres

were unusable. Prior to the first flight of the day the tanks were only filled to 80 litres to ensure the aircraft was flown within its weight and balance envelope. This was confirmed by the airfield manager who dipped the fuel tanks prior to this first flight using the same, aircraft-specific dip-stick as later used by the accident pilot.

The pilot's information manual for the Cessna 152 states that 3 litres is used during start up, taxi and takeoff (SUTTO) and that at 2,200 rpm and 3,000 ft amsl, the fuel burn would be approximately 19 litres/hr. The Chief Flying Instructor at Andrewsfield stated that she recommends a fuel burn of 25 litres/hr, depending on the sortie profile. This is based on experience gained from 20 years instructing on the Cessna 152.

Discussion

Using 25 litres/hr and 3 litres for SUTTO it is estimated that G-BWEV landed, after the first instructional flight, with 52 litres remaining. After landing at Shoreham it would have had approximately 29 litres, of which 5.5 litres would be unusable. This would have given an endurance of approximately 50 minutes. The engine stopping after 55 minutes of the subsequent flight supports these figures. Although the pilot accepts that he ran out of fuel, he cannot understand how he measured the fuel quantity incorrectly on two separate occasions. He was also unaware that the aircraft had been initially filled to a total of 80 litres that day. Had he been aware of this information, it is likely that he would have been suspicious of his initial dipping of the fuel tanks and investigated further before departing for Shoreham.