

Accident

Aircraft Type and Registration:	Spitfire IXT, G-LFIX	
No & Type of Engines:	1 Rolls-Royce Merlin 25 piston engine	
Year of Manufacture:	1944 (Serial no: ML407)	
Date & Time (UTC):	6 May 2024 at 1400 hrs	
Location:	Pitsford Airfield, Near Sywell, Northants	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - None	Passengers - None
Nature of Damage:	Propeller damaged, left wing rear spar buckled	
Commander's Licence:	Airline Transport Pilot's Licence	
Commander's Age:	62 years	
Commander's Flying Experience:	23,000 hours (of which 90 were on type) Last 90 days - 25 hours Last 28 days - 17 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot and further enquiries by the AAIB	

Synopsis

The engine cut out due to fuel starvation shortly after the pilot had transferred fuel supply from the wing tanks to the fuselage tank in preparation for landing. This resulted in a forced landing at Pitsford Airfield, a private grass airstrip, to the west of Sywell. During the landing the aircraft pitched onto its nose, damaging the propeller and left wing.

On a previous flight the pilot had inadvertently left the engine being supplied from the fuselage tank for the whole flight, rather than changing to the wing tanks once airborne, unknowingly reducing the fuel level in that tank.

As a result of the event the operator has implemented changes to the operating procedures to minimise the possibility of a reoccurrence.

History of the flight

The aircraft was on its third flight of the day and had not been re-fuelled since before the first flight. It was being operated as a private flight with a friend of the owner as passenger in the rear seat. The flight had been uneventful and as the pilot approached Sywell from the west, using the normal operating procedures, he transferred the fuel supply from the wing tanks to the fuselage tank. Approximately 30 seconds after changing to the fuselage tank, the engine 'surged' and ran down. The pilot re-selected the wing tanks and attempted to induce flow into the engine by yawing the aircraft, however he was unable to re-start the

engine. At this point the aircraft was approximately 2,000 ft agl. The pilot realised he did not have sufficient height to land at his intended destination, so opted to land at Pitsford Airfield, a private grass airstrip to the west of Sywell. The pilot transmitted a MAYDAY call on the Sywell frequency and then briefed the passenger to prepare for the landing by opening his canopy and unlocking the side door, as explained in the pre-flight briefing.

The pilot reported that he arrived in the vicinity of the landing site with some excess energy, so 'S-turned' on the approach and lowered the landing gear and flaps to slow down. He recalled that he touched down approximately a quarter of the way down the 500 m strip. He also recalled that he had lowered the tail and started to brake close to the eastern end of the mown area. With a pronounced downslope the deceleration was slower than he had hoped and as he was approaching the field boundary he turned to the right to avoid a hedge. In doing so the right landing gear dug into soft ground, pitching the aircraft onto its nose and left wing. The propeller and left wingtip were damaged. Subsequent assessment of the left wing found that the inboard end of the rear spar had buckled. The rear canopy was also released when the aircraft pitched forward.

Approximately 60 imperial gallons (imp gal) of fuel were drained from the wing tanks, however the fuselage tank was found to be empty.

Aircraft information

G-LFIX is a Spitfire Mk IX that after service in the Second World War was converted to be a two-seat trainer for the Irish Air Corps. The aircraft was retired from service and had not flown for some years until restoration began in 1979. As part of the restoration the wing fuel tanks were converted from the original 13 imp gal bladder tanks into two 60 imp gal integral tanks positioned between the spars in the wings. The fuselage tank was retained and stores 39 imp gal.

The fuel system was re-configured to supply fuel to the engine from either the fuselage tank via an electric pump that was originally used to supply the engine from a blister tank or gravity fed from both wing tanks. An engine driven mechanical fuel pump is located downstream of the fuel selection valve.

The wing tanks do not have a quantity gauge, however the fuselage tank does. The quantity of fuel is displayed on a gauge on the lower right of the instrument panel when a button is depressed by the pilot (Figure 1). Prolonged depression or removal of the button to make the gauge read permanently would cause the measuring element to fail.

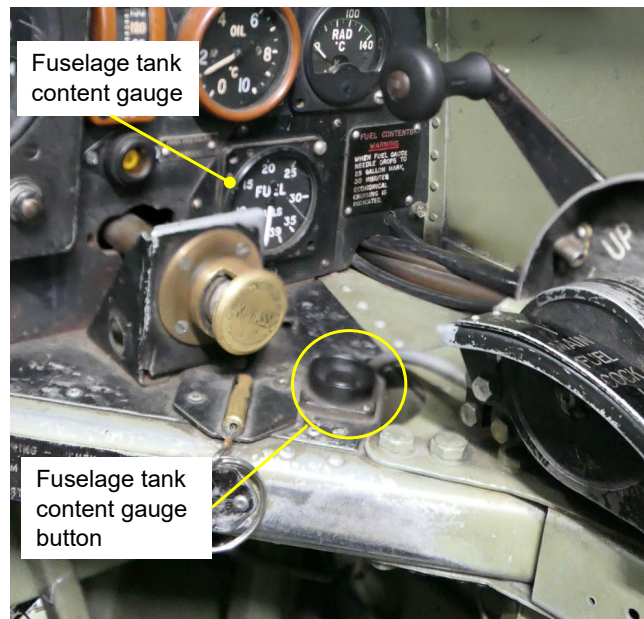


Figure 1

Spitfire G-LFIX fuselage fuel tank content indication gauge

Other information

Nature of operation

At the time of the accident the aircraft was being operated as a private flight with a friend of the owner as a passenger, however the aircraft is often used for Safety Standards Acknowledgement and Consent (SSA&C) passenger flights.

Fuel management

The aircraft had been fuelled to around 120 imp gal, approximately 40 imp gal in each wing tank and 39 in the fuselage tank. The operator had recorded the fuel consumption over several years and operated on a conservative consumption for a normal flight profile of 60 imp gal per hour, allowing for three 25 minute flights with a 30 minute reserve.

The operator's procedures are to takeoff and land using the fuselage fuel tank as the gravity fed wing tanks are less reliable during ground manoeuvring. There is also redundancy from the electrical fuel pump when fuel is supplied from the fuselage tank during operations close to the ground. Once away from the airfield, the wing tanks are selected.

Previous flights

The first flight of the day was a training sortie with the accident pilot seated in the rear seat and another pilot operating as pilot in command. After this flight the accident pilot moved to the front seat and a friend of the owner boarded the aircraft as a passenger.

During the pre-flight checks the pilot confirmed the fuselage tank contents by using the fuel quantity gauge. The quantity was as expected and sufficient for the planned flights that were to follow. The aircraft then departed the airfield. Although the flight was considered to have

been completed normally, in hindsight, the pilot believes he may have been distracted and after takeoff failed to transfer the fuel supply to the wing tanks. On return to the aerodrome, he intended to complete a straight in approach, however once in the vicinity of the airfield found that the runway in use had changed. The pilot altered his approach and when he completed pre-landing checks found the fuel tank selector set to the fuselage tank, but with the altered approach, he assumed he had already configured for landing by changing to the fuselage tank during the initial approach and did not consider anything to be abnormal.

Once the aircraft had landed the passenger was disembarked and another friend of the owner boarded as a passenger. The pilot completed the pre-start checks, however during the checks he was interrupted so that he did not check the fuselage tank contents. When returning to complete the checks he omitted to check the fuel level. The flight continued normally until the aircraft approached Sywell and the pilot transferred back to the fuselage tank and subsequently depleted the fuselage tank's contents.

Analysis

The loss of engine power was attributed to fuel starvation due to depletion of fuel in the fuselage tank supplying the engine. When the fuel was depleted, the electrical pump continued to pump air, creating an air lock in the fuel inlet. When the pilot returned the fuel supply to being from the wing tanks the gravity feed was unable to overcome the airlock and with the engine not turning the engine driven pump was unable to draw fuel into the engine to re-start.

The initiating factor arose when the pilot did not transfer the supply to the wing tanks after takeoff for the second flight. There were, however, two opportunities to identify the issue, but circumstances prevented the opportunities from being realised. The first was on approach into the airfield at the end of the second flight. Had the runway in use not changed, the pilot may have realised the fuel had been supplied from the fuselage tank for the whole flight and not dismissed the position of the selector as having been positioned during the initial approach.

The second opportunity was when the pre-flight checks were being completed prior to the third flight. If the pilot had not been distracted during the checks, he would have identified that the contents of the fuselage tank were below that expected and taken action to rectify the issue.

With the passengers for both the second and third flight being friends of the owner, there may have been a slightly more relaxed approach to the flight, which may have been a factor in causing the distraction on both counts. It is also possible that distraction of this nature could occur during an SSA&C flight.

Had the pilot checked the contents of the fuselage tank prior to changing it during either flight he may have identified that the contents were below that expected and taken mitigating action to maintain fuel flow to the engine.

Safety action

As a result of this event, the operator has introduced a requirement in their operating procedures for pilots to confirm the contents of the fuselage tank before changing to it.

AAIB Comment

Distraction and interruption are unavoidable aspects of flying, no matter which phase of flight or flight preparation they occur. The effects can be immediate or masked for some time, as was the case in this accident. The UK Civil Aviation Authority have produced Safety Sense leaflet SS31 'Distraction and interruption in General Aviation Operations'¹ which provides guidance, case studies and lessons related to distraction and interruption to improve awareness of the dangers and promote strategies to help mitigate the effects.

Footnote

¹ <https://www.caa.co.uk/our-work/publications/documents/content/safety-sense-leaflet-31/> [Accessed 10 July 2024].