

**ACCIDENT**

<b>Aircraft Type and Registration:</b>	Reims Cessna F172P Skyhawk, G-BITM	
<b>No &amp; Type of Engines:</b>	1 Lycoming O-320-D2J piston engine	
<b>Year of Manufacture:</b>	1980 (Serial no: 2046)	
<b>Date &amp; Time (UTC):</b>	27 September 2014 at 1330 hrs	
<b>Location:</b>	Near Warrington, Cheshire	
<b>Type of Flight:</b>	Private	
<b>Persons on Board:</b>	Crew - 1	Passengers - 1
<b>Injuries:</b>	Crew - None	Passengers - 1 (Serious)
<b>Nature of Damage:</b>	Aircraft destroyed, local fuel contamination of soil	
<b>Commander's Licence:</b>	Light Aircraft Pilot's Licence	
<b>Commander's Age:</b>	76 years	
<b>Commander's Flying Experience:</b>	1,463 hours (of which 1,432 were on type) Last 90 days - 14 hours Last 28 days - 4 hours	
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot	

**Synopsis**

The aircraft suffered a sudden and significant loss of engine power during the cruise portion of the flight. The pilot identified a field for a forced landing, but the aircraft struck trees at its near boundary and stalled, dropping into the field of intended landing. The pilot thought the most likely cause of the power loss was a restriction in the fuel supply to the engine.

**History of the flight**

The aircraft was flying between Leicester Airport and Manchester Barton Aerodrome when the accident occurred. The weather conditions were fine, with no cloud, good visibility and a light north-westerly wind. The aircraft was flying at 1,200 ft altitude, its route taking it through a low level airspace corridor between Manchester and Liverpool which had a maximum permissible altitude of 1,300 ft. Without warning, there was a sudden loss of engine power. The pilot confirmed that the fuel mixture control was at fully rich and applied full carburettor heat, although he noted that the carburettor air temperature gauge was reading outside of the yellow caution range. The application of carburettor heat had no noticeable effect.

Unable to maintain altitude, the pilot made a MAYDAY call to Manchester ATC. He noticed that a small reduction in throttle setting produced smoother running, although there was no noticeable recovery in power. The pilot identified a field to the right of his track in which to make a forced landing. It was level and of suitable size, although it had trees running

across the near boundary. The pilot flew an approach to the field which would take the aircraft over a section of the tree line where the trees were lower.

As the aircraft neared the field, the pilot began to suspect that it would not clear the trees, so he returned the carburettor heat to cold and applied full throttle in order to go-around. The engine did not respond, and a wingtip struck the taller trees to one side. The aircraft lost speed rapidly and stalled, descending 15 to 20 ft to the ground while carrying a small amount of forward motion. The aircraft came to rest on its left side; the passenger's door had opened during the accident sequence, allowing the passenger to escape through it. The pilot, who initially had some difficulty releasing his harness, escaped through a gap which may have been between his door and the windscreen aperture or the windscreen aperture itself.

Emergency services were quickly on scene and both occupants were taken to Warrington General Hospital. The pilot's injuries were found to be minor, but his passenger suffered a complex knee fracture.

The pilot believed that the loss of power had been caused by a restriction in the fuel supply to the engine. He recognised that carburettor icing was a possibility but thought this less likely for a number of reasons: the aircraft had not exhibited signs of an icing problem in his 14 years of flying it; carburettor icing he experienced in a Cessna 182 gave very different indications; and the carburettor temperature gauge showed a reading outside the caution range. The pilot also noted that his passenger later reported hearing an unusual noise coincident with the loss of power, although the pilot himself did not hear it.

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## **BULLETIN ADDENDUM**

The following addendum was published online on 12 February 2015 and will appear in the March 2015 Bulletin.

The aircraft suffered a sudden and significant loss of engine power during the cruise portion of the flight. The pilot identified a field for a forced landing, but the aircraft struck trees at its near boundary and stalled, dropping into the field of intended landing.

An engineering inspection of the engine revealed that the number 3 cylinder rocker cover had been punctured from the inside outwards by the inlet valve rocker arm. From the lack of impact deformations on the rocker cover, it was concluded that the damage occurred before the final accident sequence.

When the engine core was disassembled, it was found that the number 3 cylinder inlet valve had dropped into the cylinder. On removing the induction system, a piece of broken valve head was found within the tube that led to the number 1 cylinder induction valve, partially blocking the tube. This piece of material had been forced out through the broken number 3 inlet valve prior to being drawn into the number 1 cylinder inlet tube. The removal of the number 3 cylinder revealed severe damage to the top of the piston, along with severe damage to the inlet valve.

Detailed inspection of the number 3 cylinder and the dropped valve confirmed that the upper valve spring retainer had fractured in half, causing the valve to drop into the cylinder and contact the piston. This caused the valve head to fracture into three large pieces. One of the pieces stayed attached to the valve stem, the second became jammed within the valve seat in the cylinder head, and the third was found within the induction tube of the number 1 cylinder. Other smaller pieces were observed to have been liberated from the valve, some of which were most likely to have been drawn into the number 2 cylinder, causing damage to the piston before being ejected through the exhaust system.

The loss of engine power was thus attributed to the failure of the upper spring retainer of the number 3 cylinder inlet valve, which led to the valve dropping into the cylinder. With one cylinder compromised, there would have been a significant loss of power which, along with partial blocking of the number 1 cylinder induction system and minor impact damage to the number 2 piston, would have meant that there was insufficient power for sustained flight.