

Piper J3C, G-BSYO

AAIB Bulletin No: 2/2001

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Aircraft Type and Registration: Piper J3C, G-BSYO

No & Type of Engines: 1 Continental O-200-A piston engine

Year of Manufacture: 1946

Date & Time (UTC): 23 June 2000 at 1355 hrs

Location: 1 nm north-west of Cranfield Airport, Bedfordshire

Type of Flight: Private

Persons on Board: Crew - 1 - Passengers - 1

Injuries: Crew - None - Passengers - None

Nature of Damage: Substantial

Commander's Licence: Private Pilot's Licence

Commander's Age: 20 years

Commander's Flying Experience: 91 hours (of which 15 were on type)
Last 90 days - 8 hours
Last 28 days - 8 hours

Information Source: Aircraft Accident Report Form submitted by the pilot

This bulletin has been re-issued with an addendum as a result of new information coming to light which is deemed to be pertinent to the cause of the accident.

The pilot and his passenger were undertaking a VFR flight from Pent Farm near Folkestone in Kent, to attend the Popular Flying Association (PFA) rally at Cranfield. The weather conditions were dry with good visibility, broken cloud at 5,000 feet and a light wind from the west south-west.

During his pre-flight checks, the pilot had reportedly visually checked the contents of the main and auxiliary fuel tanks. The ten imperial gallon capacity main tank, located in the forward fuselage, was confirmed to be full and he estimated the contents of the auxiliary tank in the right wing to be between ten and twelve gallons. The main tank could be topped up by gravity feed from the auxiliary tank, the transfer of fuel being controlled via a selector in the cockpit. The pilot's fuel calculations showed that based on an assumed fuel consumption of four imperial gallons per hour, he would have had more than adequate fuel for the estimated two hour flight.

The aircraft departed from Pent Farm at 1200 hrs, after approximately five minutes on the ground with the engine running, during which the pre-takeoff checks were completed. The pilot selected the fuel transfer selector off for the takeoff and selected it on again in the climb, to begin topping up the main fuel tank from the auxiliary tank. The pilot was satisfied that fuel had begun transferring to the main tank, as he could see fuel in the transparent transfer pipe which passed through the cockpit.

The pilot's intended route took him north over the Thames estuary to join the recommended VFR airway to the PFA Rally from the south. Approximately 45 minutes into the flight, the pilot noticed that he could no longer see fuel in the transfer pipe and concluded that for some unknown reason, fuel had stopped transferring from the auxiliary to the main tank. As there was no fuel quantity indication system for the auxiliary tank, the pilot could not determine how much fuel had already transferred to the main tank, however he was not unduly concerned as the float valve on the main tank was still indicating full. This confirmed his belief that, up until that point, fuel transfer had been occurring. The pilot continued with the flight, however on reaching Royston, he realised that the float gauge on the main tank had become stuck, as it had not dropped as far as it should have done in the given time. The pilot decided to continue on to Cranfield as it was one of the nearest suitable airfields.

The remainder of the flight was uneventful until the pilot turned onto the downwind leg to land at Cranfield, having slowly descended to 1,200 feet QNH (approximately 850 feet QFE). Approximately one minute after the turn downwind, the engine began to lose power. All engine settings were checked and found to be correct. The pilot repeatedly pumped the throttle, which caused the engine to pick up again for approximately ten seconds, allowing the aircraft to climb back to 1,100 feet QNH, at which point the engine failed completely. The pilot was able to turn the aircraft into wind and land in a wheat field which he had seen earlier. During the landing, the aircraft nosed over and came to rest inverted, causing damage to the engine, fin, rudder and port axle. The pilot and passenger, who were wearing four-point harnesses, were uninjured and evacuated the aircraft without difficulty.

The pilot believed that less fuel than anticipated may have transferred to the main tank, which combined with a stuck float gauge, caused him to believe that he had more useable fuel than was in fact available.

Addendum to previous issue:

Since this bulletin was issued, repair work has been carried out on the aircraft. During the course of this work it was discovered that a support bracket in the engine compartment for the carburettor heat flap operating cable had broken. The effect of this failure was such that the carburettor heat flap would have remained in the cold air position despite the pilot having selected the carburettor heat on. The pilot recalled selecting carburettor heat for the descent to Cranfield but would have been unaware of the failure of the flap to operate.

The engine failure occurred shortly after levelling off after the descent. An aftercast for the Cranfield area was obtained from the Meteorological Office in Bracknell. According to the CAA General Aviation Safety Sense Leaflet Number 14 'Piston Engine Icing', the temperature and dewpoint conditions at the time were such that severe carburettor icing could be expected at reduced power settings. The pilot reported in discussions that he had observed a significant quantity of fuel draining from the main tank after he had exited the aircraft, confirming that there was, as expected, still a reasonable quantity of fuel in the tank. Based on the available evidence, it is

concluded that it is most likely that the engine failure was caused by carburettor icing during the descent due to the carburettor heat flap being stuck in the closed position as a result of the failed cable bracket.