

# **ANZSASI 2003: THE OBVIOUS CAUSE!!**

## **Introduction**

We should never assume. Only by considering all the facts available can we make an accurate assessment of the real cause(s) of an accident or incident. However, when the evidence is limited we are placed in the situation where we must determine probabilities or possibilities and some assumptions must be made.

**Caution:** things may not always be what they seem.



Photo 1: Would they have been unlucky to have been killed in this low speed accident?



Photo 2: Or were they lucky to have survived?

## **Case Study: Report 01-011 - History of the flight.**

On the morning of 29 November 2001, ZK-JGI, a Cessna 185 E, was programmed for 2 parachuting flights. The first consisting of 2 tandem pairs, a jump instructor and student, and a camera operator.

After the instructors had briefed their students, the pilot and 5 parachutists boarded the aircraft and taxied for take-off.



Shortly after take-off, at about 100 feet and passing the end of the runway, there was a sudden and total loss of engine power. The pilot established a glide and manoeuvred away from some buildings towards a clearer area. The aircraft clipped a row of trees surrounding a kiwifruit orchard before striking the ground heavily 15 m past the trees. The aircraft slid for about 10 m before coming to rest. As the aircraft slid along the ground the left wing struck some kiwifruit vines and a post, spinning it around to the left through 120°.

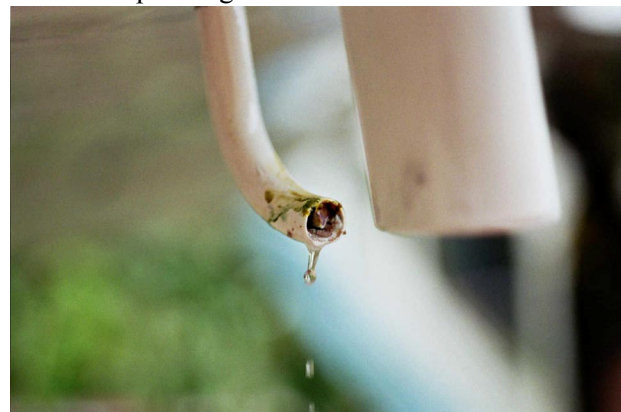
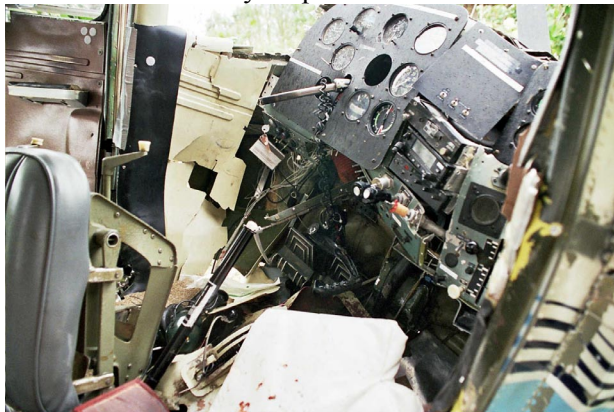
The 3 parachutists on the right side were ejected through the parachuting exit door – ending up on the ground next to the aircraft. The others remained in the aircraft. The pilot's seat broke free from the floor mountings and the pilot's face impacted the instrument console. The tandem master seated behind the pilot was able to assist his rider clear of the aircraft before giving initial first aid to the pilot and checking the other 3 parachutists. Assistance arrived within 5 minutes and the most serious were evacuated to hospital by helicopter. All survived.



The pilot and a parachutist were critically injured, 3 seriously and one with minor injuries. Due to the severity of the injuries sustained by the pilot, he was unable to be interviewed until some 3 weeks after the accident. The other occupants reported the pilot's hands moving around the cockpit and warning them to prepare for a crash landing.

### Site investigation

The aircraft was destroyed. The damage to the propeller was indicative of slow or no rotation at the time the aircraft struck the ground. Fuel was seeping from the right fuel vent, which was nearly fully blocked by a red substance. **(First obvious possible cause; fuel blockage?)** The flaps and flap lever were in about the full flap position. The power controls were in the fully forward position. The fuel shut-off valve was in the fully on position and the fuel tank selector was pointing towards the rear.



The fuel system was examined and a good fuel flow to the collector tank was possible. **(Delete fuel blockage as a cause.)**



The selector cover or plastic moulding that surrounds the fuel selector cover was not present. A modified Perspex cover had recently been installed to prevent inadvertent interference with the lever during parachuting operations. With the selector cover absent it was possible to rotate the selector to the rear and shut-off the fuel. **(Second possible obvious cause; selecting the fuel Off?)** But did the pilot, or someone else, deliberately select fuel to Off before or after the power loss?



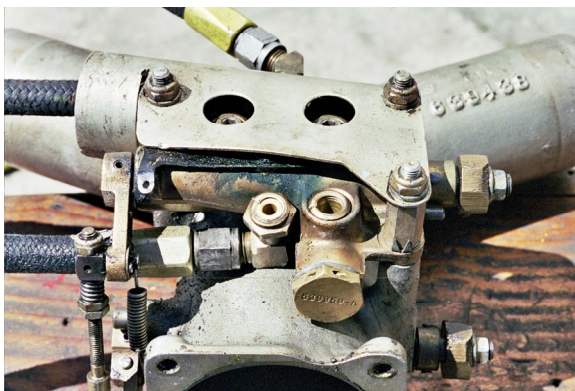
Position of the selector as found on ZK-JGI.



Cessna 185 fuel selector with the cover and labels.

### Testing and research

The engine was removed for inspection. No evidence found of obvious mechanical failure or blockages that could have caused the total power loss. However, during the inspection the fuel control unit displayed significant fuel staining and a broken fuel line leading from the engine driven pump to the fuel control unit. The break was at an elbow joint and about ½ of the diameter displayed indications of fatigue. **(Third possible obvious cause; broken fuel line?)**



Further examination determined that a sufficient fuel flow was still possible while the line was attached though a small seepage would have been evident. But did the separation of the line occur before or after the impact?

The pilot was eventually able to confirm that while preflighting the aircraft he had observed the fuel selector to be on the right tank – possibly related to the blockage in the right tank vent. He then rotated the selector 90° clockwise with the intention of selecting Both. This in fact shut off the fuel flow and left sufficient fuel in the collector tank to get the aircraft airborne, but little more. **(Delete broken fuel line as a cause.)**

The selector cover had been absent since the importation of the aircraft from Vietnam in 1995. The initial certification of the aircraft, including a type conformity check, failed to record the absence of the cover and the change in function of the fuel selector from a 3-position lever to a 4-position lever that included

an Off position. The use of sticky labels to identify the tank selection was inadequate as they did not last long.

The pilot had flown for the operator for about 3 months and had experience on several other models of Cessna aircraft where fuel shut-off was achieved by rotating the selector to the rear. However, aircraft documentation for ZK-JGI gave no indication to the pilot of any change in functionality of the fuel selector on the aircraft.

Given that the tank labels had last been applied about 2 months before the pilot started flying ZK-JGI, he was probably also deprived of any constant visual reminder of the correct operation of the selector. Lastly, the final defence against an inadvertent Off selection, the selector cover, was absent.

## **Conclusion**

There were several possible obvious causes that could have explained the sudden and total loss of engine power; a blockage in the fuel line, the broken fuel line at the fuel control, and the fuel selector itself.

Don't assume when presented with an obvious cause for the accident. Look at the big picture and consider all the possibilities. We need to ensure that lesser possibilities have been adequately accounted for before being discarded. Less they come back later and haunt us.

In essence, don't get caught. The cause should be obvious only when all other possibilities have been eliminated.

