

Reims Cessna F406 Caravan II, G-BVJT

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Aircraft Type and Registration:	Reims Cessna F406 Caravan II, G-BVJT
No & Type of Engines:	2 Pratt & Whitney Canada PT6A-112 turboprop engines
Year of Manufacture:	1994
Date & Time (UTC):	10 October 1997 at 0850 hrs
Location:	5 nm south of Shoreham, West Sussex
Type of Flight:	Private
Persons on Board:	Crew - 1 - Passengers - 2
Injuries:	Crew - None - Passengers - None
Nature of Damage:	Damage to crew door and fuselage crown
Commander's Licence:	Airline Transport Pilot's Licence
Commander's Age:	42 years
Commander's Flying Experience:	2,709 hours (of which 88 were on type) Last 90 days - 71 hours Last 28 days - 22 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot, examination of aircraft by the AAIB

The aircraft was manoeuvring between 4,000 and 5,000 feet along the South Coast between Seaford and Shoreham. The flight was uneventful until, in level flight at 5,000 feet and about 160 kt, the crew door opened. The pilot immediately reduced speed and started a descending turn towards the coast. It appeared that the door had departed from the aircraft and a passenger was despatched to the rear of the cabin to see whether there was any damage to the control surfaces. There did not appear to be any further damage and the flight continued back to the airfield, where the pilot was able to make a normal approach and landing.

During the landing roll the pilot noticed the aircraft pulling noticeably to the left and after the aircraft stopped it was found that the door had not, in fact, left the aircraft but was lying across the crown of the fuselage, still attached at its two hinges along the upper portion of the frame. It was apparent from the damage to the door itself, the fuselage crown and the damage around the hinges

that the door's contact with the crown had been violent. The gas strut, which operates between the door and the aperture frame, had been torn off and the hinge points on the door frame had been forced upwards.

The crew door in the F406 is very similar to the design in the Cessna 404 Titan and is an upward-opening transparency to the left of the pilot's seat. The door is normally secured by two latches engaging latch plates in the lower portion of the door frame and these two latches are moved through a simple 'over-centre' linkage by a 'D' handle on the interior of the door and an exterior handle which normally lies flush with the door. A strong spring acts to move the linkage from its neutral ('on centres') position to either the latched or unlatched position. The forward of the two latch plates is equipped with a microswitch connected to a caption on the Central Warning Panel (CWP) and to an 'attention-getter' light. In addition to this linkage there is also a secondary lock, whereby a simple latch, mounted on a pivot forward of the aperture, rotates aft into a slot in the forward edge of the door. This secondary lock is operated by a small lever inside the cockpit but cannot be operated from outside the aircraft without a flat-headed screwdriver or similar tool.

As this aircraft was not being used for bulk cargo, the crew door would not normally be used and the crews were aware that, in an emergency situation, the secondary lock would make the crew door almost impossible to open from the outside. The aircraft was, therefore, generally operated without the secondary lock engaged.

After the accident, the door was reportedly found with the two latches in their fully extended positions and the door handles (interior and exterior) in the CLOSED position. Examination of the door showed the latch system to be intact and properly rigged and there was no damage to the latch plates in the aperture frame, nor to the secondary lock. The structural damage to the door was entirely consistent with the loads imposed by slamming onto the fuselage crown and there was no evidence of any warping of the door out of the plane of the frame.

The strong spring in the latching mechanism ensures that the linkage may move readily from its neutral (that is, 'on centres') position to the unlatched position. Trials of the replacement crew door in GBVJT after its repair showed that, with this design, it was difficult to achieve a positive latching of the door and that the 'D' handle on the interior of the door could lie in a horizontal, apparently locked, position while the linkage was actually neutral ('on centres'). In this neutral position the forward latch would still be fully engaged with its latch plate and the caption on the CWP would not illuminate. It appears most likely that the door then became unlatched through inadvertent movement or vibration and, with the secondary lock not engaged, the door opened. This would be consistent with the pilot's comment that there had been no prior indication of a door problem on the CWP or elsewhere.