

Cessna F337F, G-AZKO, 11 October 1997

AAIB Bulletin No: 4/98 Ref: EW/C97/10/8 Category: 1.3

Aircraft Type and Registration:	Cessna F337F, G-AZKO
No & Type of Engines:	2 Continental IO-360-C piston engines
Year of Manufacture:	1971
Date & Time (UTC):	11 October 1997 at 0916 hrs
Location:	Alderney Airport, Channel Islands
Type of Flight:	Private
Persons on Board:	Crew - 1 - Passengers - 2
Injuries:	Crew - None - Passengers - None
Nature of Damage:	Damage to front propeller, landing gear doors, underside of fuselage and aerals
Commander's Licence:	Private Pilot's Licence
Commander's Age:	59 years
Commander's Flying Experience:	2,706 hours (of which 1,500 were on type) Last 90 days - 40 hours Last 28 days - 6 hours
Information Source:	AAIB Field Investigation

History of flight

The pilot, accompanied by two passengers, was on a private flight from Wellesbourne Mountford Airfield to Alderney Airport in the Channel Islands. The pilot made his approach to Runway 26 and remembers selecting the gear 'Down' at approximately 4 miles range from Alderney. Before landing, he checked that he had a 'Green' light and that the gear handle was in the 'Down-Neutral' position; with a relatively 'flat' approach because of cloud, he was maintaining a reasonable amount of engine power. Then, as the pilot retarded the throttles just before touchdown, he heard a warning horn and, after touchdown, was aware of the gear collapsing. G-AZKO slid along the runway and off the right side onto the grass. A weather observation made at 0920 hrs revealed a surface wind of 220°/24kt, recent rain, visibility of 20 km and cloud scattered at 700 feet agl and broken at 1,500 feet agl.

The ATC controller was very busy at the time of the accident but watched the aircraft from when it was about two miles from touchdown. He saw something which he presumed to be the gear below the aircraft and then saw G-AZKO land. Almost immediately after touchdown, the controller saw what he thought was the gear fold upwards into the fuselage. Another witness was a pilot who is qualified on the Cessna 337; he was watching from a position approximately 200 yards from the threshold and had a slightly off-set but head-on view of the aircraft approach. He could not be certain about the nose gear position but was certain that both main gear legs were in a "Trail position, neither up or down". Following the accident, the pilot of G-AZKO acknowledged that the warning horn he had heard just before touchdown, and which he had thought was the stall warning, could have been the gear warning horn.

The passenger in the front right seat is a PPL holder qualified on the Cessna 337; he subsequently confirmed that, prior to landing, he noted that the green gear light was illuminated and that the gear handle was neutral.

Landing gear description

The landing gear system in the Cessna 337 is unusually elaborate for a light aircraft. It includes a common hydraulic actuator for the main landing gears, a separate hydraulic actuator for the nose gear leg, gear uplock release actuators, a nose gear door actuator and separate actuators for the main landing gear doors. In a normal gear extension sequence, the landing gear handle will be moved to 'Down'; the landing gear doors will extend; the landing gear uplocks will then be released and the legs will extend; the landing gear doors will then retract and the landing gear handle will move to the 'Down-Neutral' position. Confirmation of the gear being in its 'down and locked' condition is provided by a single green light signalled by three gear downlock microswitches, wired in series. There is a 'landing gear warning horn', separate and distinct from the stall warning horn, which sounds when the landing gear is not fully locked down and either of the throttle levers has been retarded.

If the landing gear sequence is disrupted by upward movement of the landing gear handle from the 'Down' to the 'Down-Neutral' position, the landing gear actuators will stop and the green gear light will not illuminate. The landing gear warning horn will then sound when either throttle lever is retarded.

Initial examination

When the aircraft was recovered, the gear handle was in the 'Down-Neutral' position and the gear legs were found in their retracted positions, with uplocks engaged. The landing gear doors had been heavily abraded by contact with the runway surface. The nose landing gear doors were found in the closed position, as were the forward ('strut') landing gear doors; the aft clamshell-type doors were almost fully open, consistent with the abrasion marks. During the recovery operation, the landing gear legs were successfully hand-pumped to the 'Down and Locked' position and the aircraft was ferried, gear down, to a maintenance organisation on Guernsey for repair.

Extensive extension-retraction tests were performed using an external hydraulic supply, shortly after the ferry of G-AZKO to Guernsey. The gear sequencing was found to operate correctly in all cases, with complete retractions and extensions. The landing gear warning and the stall warning horns were also found to be operating. It was noted that retardation of the No 2 throttle alone did not activate the gear warning horn; retardation of the No 1 throttle did activate the warning and in

this accident, both throttles would have been retarded together. The landing gear indicator system was found to be operating correctly, with all three microswitches in proper adjustment.

Examination by AAIB

The aircraft was later examined, before repair, by the AAIB. The damage to the landing gear doors was entirely consistent with them contacting the paved runway surface while in a partially open state; this contact served to close the nose doors and 'strut' doors but opened the clamshell doors further.

A series of tests showed the landing gear still to be operating correctly. It was confirmed during these tests that slight upward movement of the landing gear handle from the 'Down' to the 'Down-Neutral' position stopped the landing gear extension sequence; the doors could then be manually moved and, as the landing gear legs had not engaged the downlocks, the green gear light would not illuminate. The landing gear warning horn would sound when the throttle levers were retarded.

Extensive tests showed that the gear lights worked correctly. One scenario which would replicate the damage to the gear doors is that the gear handle was displaced from the 'Down' position to the 'Down Neutral' position during gear extension. This would result in the doors being partially or fully open and the gear legs being held in their uplocks or trailing slightly. This situation would result in the gear warning horn being activated as the throttles were retarded for landing. However, for this scenario to be realistic, the green gear light would not be illuminated. Nevertheless, the pilot was adamant that the green gear light was illuminated prior to landing and that the light was still illuminated after the aircraft came to rest.

Subsequent inquiries

A check with the Civil Aviation Authority revealed that this type of aircraft had no previous incidents involving the gear not being extended but with a green gear light illuminated. Additionally, Cessna Aircraft Company confirmed that the green gear light could only illuminate with all three downlock microswitches closed.