

Viscount 808, G-OPFE, 24 March 1996

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Aircraft Type and Registration:Viscount 808, G-OPFE

No & Type of Engines:4 Rolls-Royce Dart 510G turboprop engines

Year of Manufacture:1958

Date & Time (UTC):24 March 1996 at 2135 hrs

Location:Belfast International Airport

Type of Flight:Training

Persons on Board:Crew - 2 Passengers - None

Injuries:Crew - None Passengers - N/A

Nature of Damage:Fuselage and No 3 nacelle undersurface scraped, inboard flapsdamaged and all propeller blades severely damaged

Commander's Licence:Airline Transport Pilot's Licence with IRE/TRE qualificationson type

Commander's Age:58 years

Commander's Flying Experience:15,601 hours (of which 3,918 were on type)

Last 90 days - 41 hours

Last 28 days - 21 hours

Information Source:AAIB Field Investigation

History of the flight

The two crew members had reported at Stansted at 1130 hrsto catch a passenger flight to Belfast where they were rosteredfor a training detail; immediately prior to this duty day, theyboth had two days off. The first officer had completed a commandcourse on the simulator the previous week and this training detailwas part of his conversion to the left hand seat; the trainingcaptain had also been involved in the simulator the previous week. The detail was planned to involve two flights; the first wouldcover the mandatory items for the type rating test (1179) andthe second would complete the first officer's base check and initialline check.

On arrival at Belfast, the crew checked in to the airport hotel,changed into uniform and went to the meteorological office atapproximately 1600 hrs for a weather briefing. This briefingindicated that

the weather was close to the limits required for the completion of the type rating test items but, with a forecast of a suitable area to the north of the airfield, the crew decided to carry on with the detail.

For the first flight, G-OPFE left the stand at 1815 hrs and took off at 1827 hrs. All the necessary items were completed successfully, albeit with some difficulty because of the variable cloud base, and the crew landed at 2010 hrs. By 2015 hrs, G-OPFE was back on stand and the crew kept the engines running while they had a short brief for the second flight. At 2025 hrs, they taxied off stand and positioned for a departure off Runway 07.

On this second flight, following a take off at 2031 hrs, the training captain initiated an outboard engine failure just after V_R by retarding the associated throttle. The appropriate remedial actions were simulated and the first officer carried out a 3 engine ILS approach and go-around to Runway 17; there had been no abnormal switch positions required because of the simulated engine failure. The go-around was followed by a 3 engine VOR approach to land on Runway 07. The different runways were used because there is no ILS on Runway 07, the runway in use. After landing, the first officer repositioned G-OPFE and made a full power take-off from Runway 07, commencing his roll at the intersection with Runway 17. The aircraft was climbed to 4,000 feet and established in the cruise at 200 kt IAS. During this cruise, there were no unserviceabilities noted with G-OPFE. The crew continued in a north-westerly direction until approximately 5 nm from Eglinton Airport when they requested, and were given, permission to turn back towards Belfast International Airport. For the subsequent approach, the surface wind was 090°/15 kt, visibility was 2,500 metres and the cloud was scattered at 1,000 feet and overcast at 4,200 feet agl.

After establishing contact with Aldergrove radar, the crew were cleared to commence a VOR/DME approach to Runway 07 for a final landing. It was confirmed from the CVR that the 'Initial Approach' checks were completed 'down to the line'. However, although the first officer at one stage commented that it was a bit early to complete the rest of the 'Initial Approach' checks, there was no evidence that these or the 'Finals' checks were subsequently requested or actioned. The landing gear would normally be selected down during the 'Initial Approach, below the line' checks and confirmed during the 'Finals' checks. The final approach profile was closely monitored by the commander and, from comments on the CVR, the approach appeared very stable. In the later stages of approach, the first officer was heard asking for 85% flap and the training captain was heard confirming this selection. These were the only comments heard referring to flap selection or position, although it is acceptable company practice for crews to request flap changes by visual means. The final flap position (100%) is used to decrease ground roll and is selected during the flare or after touchdown. Other relevant comments which were heard on the CVR included a reference to landing lights; this is the last item on the "Finals" checks. As the throttles were retarded in the flare, the gear warning horn was heard on the CVR, followed within 23 seconds by sounds of the propellers contacting the runway surface. After coming to a stop on the runway, the crew secured and evacuated the aircraft. The airport Rescue and Fire Fighting Service were on the scene in less than one minute.

Post accident examination

Subsequent runway and aircraft examination showed that G-OPFE had made a gentle touchdown on Runway 07 close to the PAPI position, somewhat left of the centreline. Initial contact was on both inboard propeller tips. After a few metres, both outboard propellers contacted the runway, progressively followed by radioaerials mounted beneath the fuselage, the fuselage undersurface, the inboard part of both inboard flaps and the No 3 engine nacelle. The aircraft continued down the left

side of the runway, across the intersecting Runway 17/35, and came to rest on Runway 07 after a ground slide of approximately 480 metres.

Damage consisted of severe bending and scraping of all propeller blades, abrasion of much of the undersurface of the fuselage and the No 3 engine nacelle lower cowl, and abrasion and moderate distortion of the inboard flaps. A very small quantity of fuel was reportedly released from the No 3 engine nacelle. There was no fire.

Examination showed that the flaps had been in the fully deployed position (100%, 47°) at touchdown and the flap lever was found selected at 47°. All three landing gear legs had been fully retracted at touchdown and throughout the ground slide. After the aircraft had been lifted, the three legs deployed into downlock without difficulty using the emergency lowering procedure. The landing gear selector was found with the 'Down' button pushed in, but the electric actuator that is switched by the selector was found in the fully up position; this actuator had not been disturbed during recovery operations. The landing gear indicator was found in the 'Day' (ie bright) setting. Examination and testing of relevant systems was carried out, except for the hydraulic generation system; this indicated that the landing gear operating and indication systems functioned normally.

Aircraft documentation

The Operations Manual found on the aircraft included the following paragraph dated 1 May 1995 which stated:

"10.2.7 LANDING GEAR WARNING HORN(1)

In the starboard console, provides an audible warning when:

- (a) All four throttles are moved to less than one quarter open and any landing gear unit is not locked down.
- (b) Flaps are selected to 68% and any landing gear unit is not locked down.
- (c) The landing gear has been selected 'Up', but the nose unit is not central."

Additionally, there is an entry in the Operations Manual stating that the nose unit red light in the 'Landing Gear Position Indicator' comes on whenever the landing gear warning horn blows.

Landing Gear Warning Systems

Testing showed that the landing gear warning system (horn and red light) operated when Condition (a) above was met. However, examination revealed that no system whereby the flap selector or flap system could provide an input to the landing gear warning system was present on this aircraft. Information from the manufacturer indicated that the facility for the flap selector to trigger the warning system was not an original feature on Series 800/810 Viscounts but could be added by Modification FG 2030, issued in November 1966. This was categorised by the manufacturer as optional and has not been made mandatory by the CAA.

On this class of aircraft, a Ground Proximity Warning System (GPWS) typically would also provide a pre-landing warning of an approach with the landing gear retracted. However, GOPFE had

been granted a CAA exemption on 5 March 1984 from the requirement for a GPWS, applicable while the aircraft was used solely for the carriage of cargo, and no GPWS was fitted.

Thus, the only condition that would trigger a warning of a retracted landing gear on GOPFE prior to landing was retardation of all throttles below approximately one quarter. On a normal approach this would commonly occur shortly before touchdown, as on the accident flight. Six of the other seven Viscounts in the operator's fleet flown by the crew of GOPFE did include flap selector position as a trigger for the landing gear warning system. The lack of the facility on the seventh aircraft had been queried in December 1994; it had been established that this was in accordance with the aircraft design standard but that the Operations Manual for the aircraft wrongly stated that the facility was present. Since the accident to GOPFE, the facility has been incorporated on the seventh aircraft and checks have been conducted on the other six to confirm the correct functioning of the warning system.

Safety recommendation 96-20

The gear warning system on G-OPFE was not as described in the current Operations Manual for the Airline. Additionally, and of greater significance, the degree of pre-warning afforded by the system in G-OPFE was ineffective in that the pilot was only actively warned that his gear was not down and locked when he retarded the throttle for his landing flare. While accepting that the accurate accomplishment of checks would ensure that the aircraft is in the correct configuration, the present warning is of debatable value.

It is therefore recommended that the CAA ensure that Viscount aircraft have a system to warn the crew, in sufficient time to take effective action, that all landing gear legs are not fully locked down and that Operations Manuals to which they apply fully reflect the standard of the aircraft.