No: 12/83 Ref: EW/C845/01

Aircraft type and registration:	Partenavia P68B G–OCAL (light twin-engined fixed wing aircraft)
Year of Manufacture:	1979
Date and time (GMT):	8 September 1983 at 1107 hrs
Location:	8 nm west of Dundee Airport
Type of flight:	Public Transport
Persons on board:	Crew – 1 Passengers – 3
Injuries:	Crew – Nil Passengers – Nil
Nature of damage:	Right undercarriage leg torn off; damage to aircraft stabilator and rudder controls
Commander's Licence:	Commercial Pilot's Licence
Commander's Age:	35 years
Commander's total flying experience:	2856 hours (of which 24 were on type)

The aircraft was on a charter flight from Manchester to Dundee, via Tees-side. An aftercast of the weather at the time showed that there was broken stratus at 400 ft over Dundee with further layers from 1000 ft up to 25000 ft. The surface wind was 120°/15 knots and visibility below cloud was 3000 metres. The pilot approached Dundee from the south-east at FL45 on a VFR flight plan, using RAF Leuchars lower airspace radar service. Leuchars Radar cleared the aircraft to FL40 as it approached Dundee. Another aircraft en route from Glasgow to Dundee was seven minutes ahead of G–OCAL and reported over the Dundee NDB at 1056 hrs. The pilot of this aircraft had sight of the runway from 3000 ft and carried out a visual descent, landing at 1100 hrs. After landing, the pilot reported scattered stratus at 600 ft with a main cloud base of 1000 ft over Dundee.

According to the evidence of the Dundee controller, shortly after the aircraft ahead had begun its visual descent, G–OCAL was cleared to 3000 ft and was later cleared for an NDB approach, the pilot confirming that he had copied the weather details transmitted by the earlier aircraft. Some minutes later, at 1103 hrs, G–OCAL reported BEACON OUTBOUND at an altitude that cannot be verified because no tape recording of RTF traffic was available at Dundee that day. However, the pilot believes he crossed the beacon at 4000 ft.

The NDB approach at Dundee specifies an outbound tack of 262° (M) for 5 nm, followed by a right turn to intercept the inbound heading of 102° (M) at 2240 ft QNH. Descent inbound is to 1543 ft at the fan marker (outer marker), to 983 ft at the NDB and thence to decision height. The pilot of G–OCAL called BASE TURN COMPLETE at a time that cannot be established, but at 1107 hrs, approximately 4 minutes after leaving the NDB outbound, he reported to Dundee that he was overshooting and diverting to RAF Leuchars. The tape record of the telephone link between Dundee and RAF Leuchars shows that at 1107 hrs the Dundee controller reported that the pilot had said he seemed to have struck the ground at 1100 ft and had lost a wheel. At 1108 hrs, the controller relayed to Leuchars that the aircraft was maintaining 1300 ft but was unable to climb. Two minutes later, the aircraft was handed over to Leuchars Radar to whom the pilot reported that he was at 1000 ft, that he had elevator control problems and that the aircraft was persistently attempting to turn to the right. The pilot was passed directions for a wide right hand pattern, during which he managed to climb the aircraft to 2000 ft, before executing a precision radar approach to runway 09 at RAF Leuchars. The aircraft landed without further damage at 1138 hrs on its remaining two wheels and turned gently to the right, settling on the grass beside the runway on its left main wheel, tail and right wingtip.

The aircraft's right main wheel and undercarriage leg were found on the northern shoulder of a hill 994 ft high, 200 metres south of the inbound approach track and 8.3 nm from touchdown. Ground marks showed that all three wheels had run through the heather for 93 ft approximately along the 950 ft contour before the right leg was torn off by rising ground. The magnetic track of the ground marks was 069°.

The pilot's recollection of the time before the impact is unclear. He stated that the horizontal situation indicator was unserviceable in the heading mode and that he was flying the aircraft on the directional gyro. He described flying an NDB approach exactly according to the approach plate, setting 20" manifold pressure and 15° flap over the NDB, descending outbound for 2 mins 15 secs, allowing for tailwind and 10° starboard drift, before turning right at the standard rate at 2200 ft. He described how, when he had completed the base turn and established the aircraft on the inbound track, he began a further descent to 1550 ft, again using 20" of manifold pressure, and, in less than one minute from commencing descent inbound, he felt an impact with the ground. He stated that his No 1 altimeter was reading 1600 ft at the time but he could not recall the reading on the No 2 altimeter.

After the impact is was apparent to him that he had lost elevator control. He re-established pitch control using power and trim and then found that, although he needed right rudder to maintain directional control, the aircraft wanted to turn to the right and was very reluctant to turn left. Despite these serious control problems, he still succeeded in carrying out a radar approach, for the most part in IMC, and landed the aircraft safely.

Inspection of the aircraft revealed that, when the right undercarriage leg was torn off, its inboard section had torn downwards from its inboard mounting, severing the stabilator down cable and both rudder trim cables and displacing the right rudder cable from its pulley. Before separating, the rudder trim cables had pulled the tab to full right deflection. The leg had impacted heavily on the right stabilator, puncturing the underskin and rupturing the main attachment frame for the stabilator pivot tube.

Both altimeters were found set on 1001 mbs, which was the Dundee QNH at the time of the accident. Both were removed from the aircraft and tested. The No 2 altimeter was found to have a small amount of stiction, causing it to lag by up to 40 ft in descent, but the No 1 altimeter was fully serviceable, with a maximum error of 20 ft in the range of 0 – 5000 ft. The aircraft pitot/static system was tested and found to be free of defects. Further checks showed the vertical speed indicator, directional gyro and ADF equipment to be operating within limits and no significant errors were found during an ADF loop swing.