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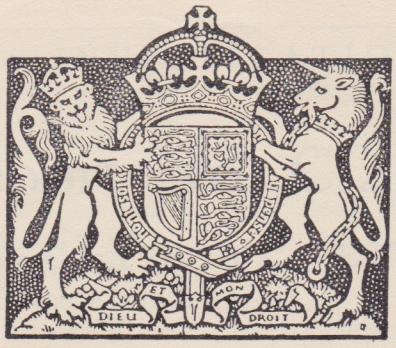

MINISTRY OF CIVIL AVIATION

CIVIL AIRCRAFT ACCIDENT

Report on the Accident to Dakota PH-TBO which occurred on 6th November 1946 at Shere, Surrey

LONDON: HIS MAJESTY'S STATIONERY OFFICE

1947

NINEPENCE NET

MINISTRY OF CIVIL AVIATION
ARIEL HOUSE, STRAND
LONDON, W.C.2

1*st February*, 1947

The Minister of Civil Aviation

My Lord,

I HAVE the honour to submit herewith my report on the circumstances of the accident to Dakota PH-TBO which occurred at Shere, Surrey, on 6th November, 1946.

I have the honour to be,

My Lord,

Your obedient servant,

VERNON BROWN
Air Commodore (*Retired*)
CHIEF INSPECTOR OF ACCIDENTS

Report No. C.468

AIRCRAFT : Douglas Dakota C.47A PH-TBO. ENGINES : 2 Pratt & Whitney Twin Wasp Series S1C3G

OWNERS : K.L.M. Royal Dutch Airlines

CREW : Pilot .. .. .. Mr. O. W. P. Kappelmeier—Injured
Flight Engineer .. .. Mr. Th. J. Moerkerk—Injured
1st Radio Operator .. Mr. A. J. Stam—Uninjured
2nd Radio Operator .. Mr. J. A. Sunrink—Slightly Injured
Stewardess .. .. Miss C. Kans—Slightly Injured

PASSENGERS : Fifteen. One injured and one slightly injured

PLACE OF ACCIDENT : Barnet Wood, 1¼ miles N. of Shere, Surrey, England

DATE AND TIME : On 6th November, 1946, at 0916 hrs.

ALL TIMES QUOTED IN THIS REPORT ARE G.M.T.

1. *NOTIFICATION*

First information was received by telephone at 1005 hrs. from Air Traffic Control, Croydon Airport. The message stated that the aircraft had force-landed without casualties. At 1400 hrs. another telephone message was received from the Superintendent, Godalming (Surrey) Police to the effect that the aircraft had crashed and that there were five casualties. The scene of the accident was visited the next day.

2. *CIRCUMSTANCES OF THE ACCIDENT*

The accident occurred towards the end of a scheduled flight from Amsterdam to Croydon. The aircraft took off from Amsterdam (Schiphol) Airport at 0750 hrs. and the pilot set course for Croydon at about 0755 hrs. The first part of the flight was made at 6,000 ft. in good weather ; there was a slight ground haze with little cloud and the pilot was able to "contact fly." The 0800 hr. and 0830 hr. weather reports for Croydon Airport, broadcast by the London Air Traffic Control, were received by the radio operator at 0817 and 0845 hrs. respectively. These were passed by message pad slip to the pilot who adjusted his altimeter to the barometric pressure setting of 30.59 in. given by both reports. The broadcasts stated that Q.B.I. conditions were in force in the London area.

At about 0902 hrs. and when the aircraft was in the vicinity of Gravesend, permission was obtained to enter the London Control Zone, together with instructions to fly at a height of 2,500 ft. and to approach Croydon Airport on a true bearing (Q.T.E.) of 075 deg. Three minutes later permission was received to change the frequency to that of Croydon (348 kcs.). The pilot commenced to descend and the radio operator opened up communication with Air Traffic Control, Croydon, giving them an E.T.A. of 0910 hrs.

From Gravesend onwards the weather deteriorated to 10/10 cloud with tops at about 1,800 ft. but with good visibility above. The pilot flew on the Croydon M/F beacon (845 kcs.) steering by his radio compass which had been tuned in and checked by the 2nd radio operator. This beacon is located 2.45 miles on a true bearing of 343 deg. from Croydon Control Tower. At the given E.T.A. of 0910 hrs. the aircraft was still descending and the pilot has stated that at "0911 hrs." when at a height of about 2,000 ft. he passed over the Croydon M/F beacon; he was confident on this point since he had checked the sense of the beacon signals. The distance from the beacon to the scene of the crash is approximately 18 miles and the accident took place at 0916 hrs. As there was little wind and the ground speed of the aircraft was approximately 160 m.p.h. the actual time of passing over the beacon was most probably between

0908 and 0909 hrs. From the beacon onwards he steered " between 260 deg. and 270 deg. magnetic " for " about three to four minutes " until he received a signal from Croydon telling him he was No. 1 to land and that the landing direction was 120 deg. magnetic. According to the Croydon log this signal was transmitted at 0912 hrs. On receipt of this signal the passengers were ordered to fasten their safety belts and the aircraft again commenced a descent at 300-400 ft./min. before entering cloud at about 1,800 ft. During the descent Croydon were asked to send Q.D.M's (*i.e.* the magnetic course to steer with zero wind to reach Croydon). The radio logs showed that Q.D.M's of 80 deg., 80 deg. and 73 deg. were sent between 0913 and 0915 hrs. A left hand turn was commenced whilst in cloud and on the receipt of the last Q.D.M. the pilot levelled out the aircraft, at a height stated by him to have been 1,200 ft. as shown by his altimeter, and set course accordingly. As two Q.D.M's of 80 deg. were received the left hand turn was most probably commenced immediately after the receipt of these signals. Preparations to land were then made, all routine checks being carried out by the pilot and crew. On the receipt of the last Q.D.M. the undercarriage was lowered and almost immediately after this the aircraft whilst still flying in cloud struck the tops of trees and crashed. This was at 0916 hrs.

The pilot was knocked unconscious and the flight engineer, who was sitting in the co-pilot's seat, was injured. After the occupants had scrambled out, Mr. G. S. Mayer, one of the passengers, noted a small fire in the bracken amongst the disrupted pipe lines of the port engine nacelle. He acted promptly and, using a hand fire extinguisher, put out the flames and so averted what might have been a serious conflagration.

3. *FURTHER DETAILS*

(*a*) *The Aircraft*

The aircraft was received by K.L.M. from England on 14th January, 1946, with a total time-in-air of 934 hours. On 1st February, 1946 it was returned to Scottish Aviation, Ltd., Prestwick, for overhaul and conversion. This was completed by 18th April, 1946, and after a Certificate of Airworthiness, No. 430, had been issued by the Dutch Ministry of Transport on 20th April, 1946, the aircraft was taken into service by K.L.M. on 22nd April, 1946. It was given three 150 hour routine periodical inspections on 21st May, 1946, 20th June, 1946, and 25th July, 1946, respectively. Minor " D " and " B " inspections had subsequently been carried out at scheduled times, the last inspection having been completed immediately prior to the flight on which the accident occurred. Up to the date of the accident the aircraft had a total time-in-air of 1,792 hours and no major repairs or replacements had been made. The altimeters were those originally fitted to the aircraft when it was received by K.L.M. They had given satisfactory service and had been checked for correct functioning immediately before the flight on which the accident occurred. The radio equipment consisted of two Liaison type C.W. M.C.W. and W/T transmitters and receivers, two Command R/T transmitters and three receivers. The equipment also included one ADR type radio compass, one V.H.F. receiver and one S.B.A. receiver together with the normal intercommunication system.

(*b*) *The Engines*

The port engine (No. C.P. 350051) had a total running time of 1,776 hours of which 448 had been since overhaul.

The starboard engine (No. C.P. 352216) had a total running time of 1,816 hours, of which 295 had been since overhaul.

Both engines had been properly maintained and inspected and there is no record of any serious defect or major replacement.

A daily Certificate of Airworthiness, No. 1239, was duly issued prior to the flight.

(*c*) *The Loading*

The gross weight of the aircraft at take-off was 11,700 kgms., against a maximum permissible weight of 12,712 kgms. There was no reason to believe that the C.G. position was outside the prescribed limits. At the take-off from Amsterdam there were 1,600 litres of fuel on board of which approximately 510 litres had been consumed up to the time of the crash.

(*d*) *The Crew*

(i) The Pilot

Mr. O. W. P. Kappelmeier is 32 years of age and received his primary flying training at the Netherlands National Flying School from July, 1935, to March, 1936. From March, 1936, to September, 1937, he received further training by K.L.M., after which he served as a military pilot until October, 1938, completing 230 hours solo in various single and twin-engined aircraft. He obtained the following licences :—Pilot's "A" on 18th December, 1935, Pilots's "B" on 13th September, 1938,

Navigator's Second Class on 13th September, 1937, and W/T Operator's on 6th December, 1938. In October, 1938, he was employed by K.L.M. and after refresher training made four return trips to the Far East as co-pilot. From August, 1939, until May, 1940, he was on military service. After the war he rejoined K.L.M. and was given a course in D.H.89s and Douglas D.C.3s and 4s, being licensed for these latter types on 19th February, 1946, and 23rd August, 1946, respectively. His "B" Licence No. 113, was also endorsed for Douglas C.54s and was valid until 22nd January, 1947. He had flown 200 hours during training and as pilot and co-pilot on the inland lines of the K.L.M. and about 800 hours as a co-pilot on the inter-continental lines to New York, West Indies and the Far East. He started flying as a chief pilot on the European lines of the K.L.M. on 1st March, 1946, and up to the time of the accident had flown 260 hours as chief pilot and about 100 hours as co-pilot on these routes. On 9th April, 1946, he made his test flight on the Amsterdam-Croydon route and was appointed a chief pilot on 18th April, 1946, since when and up to September, 1946, he had flown the route fourteen times, four flights of which were at night. K.L.M. records show that he had received recent Link Trainer instruction and was in regular flying practice. This pilot did not maintain a personal flying log book.

(ii) The Flight Engineer

Mr. Th. J. Moerkerk has flown approximately 950 hours as flight engineer in Dakotas since March, 1946. His Engineer's Licence, No. 104, endorsed for Douglas D.C.3s and C.47As was issued by the Netherlands Ministry of Transport on 15th April, 1946, and is valid until 5th March, 1948.

(iii) The First Radio Operator

Mr. A. J. Stam has been operating since 1936, having previously been employed in the Mercantile Marine. He has been employed by K.L.M. for about eight months and has flown as radio operator over the Amsterdam-Croydon air route approximately fifteen times. His Licence, No. 187, was issued by the Netherlands Ministry of Transport on 13th May, 1946, and is valid until 9th May, 1948.

(iv) The Second Radio Operator

Mr. J. A. Sunrink was under training on the flight. His Licence No. 189, was issued by the Netherlands Ministry of Transport on 22nd May, 1946, and is valid until 8th March, 1948.

(e) The Weather

The weather was as follows :—

(i) At Croydon Airport	0800 hrs.	0830 hrs.	0900 hrs.
Cloud	10/10 at 1,000 ft.	10/10 at 1,000 ft.	10/10 at 1,000 ft.
Cloud	3/10 at 300 ft.	2/10 at 300 ft.	5/10 at 300 ft.
Surface Wind	3 m.ph. from NE	3 m.p.h. from NE	1 m.p.h. from NE
Barometric Pressure at airfield level (QFE)	1,027 mbs.	1,027 mbs.	1,027 mbs.
Altimeter Setting (QFF)	30.59 in.	30.59 in.	30.59 in.
Ground Visibility	1,500 yds.	1,500 yds.	1,500 yds.

(ii) At Scene of Crash—At about 0916 hrs.

Cloud .. .. 10/10 at 70 ft.
Ground Visibility .. 150 yards. Mist.

(f) Examination of the Wreckage

The scene of the accident was approximately 18 miles from Croydon Airport on a true bearing of 240 deg. Inspection showed that the aircraft had crashed in a copse of fir saplings on high ground 637 ft. above sea level. It had first struck the top branches of a 45 ft. high oak tree and had then ploughed its way in an almost level attitude through the fir saplings for a distance of 210 yards on a bearing of 55 deg. True, finally swinging through approximately 180 deg. to starboard. The first impact smashed the nose and knocked the pilot unconscious. Both engines had broken adrift from their nacelle mountings and approximately 8 ft. of the starboard wing-tip and the aileron had been smashed off by impact with trees and the ground. The port undercarriage had collapsed and the fuselage had broken immediately forward of the tail unit. The cabin portion of the fuselage was not badly damaged but many of the passengers' seats had broken away from their floor attachments in a backwards direction.

NOTE.—The fact that safety straps were in use must have saved several of the passengers from injury.

The tail unit was severely crushed and twisted. The pilot's instrument panel had been wrenched out and was found adjacent to the port wing-tip. The condition of the propellers showed that both engines were under power at the time of the crash.

The settings of all controls and the reading of the instruments which had not been affected by impact confirmed the crew's evidence as to their state immediately prior to the accident.

The barometric pressure setting on the pilot's altimeter read 30.57 in. and the co-pilot's 30.72 in.

Examination of the wreckage failed to reveal any defect in the airframe or engines which could not be attributed to impact.

(*g*) *Laboratory Examination*

Both altimeters were forwarded to the Royal Aircraft Establishment, Farnborough, for pressure testing and detailed strip examination. Extracts from their report read as follows :—

> " Prior to dismantling for examination, a test for case leakage was carried out on each instrument. This showed that both instruments were quite free from case leakage . . . . The derangement and damage observed in both instruments were such as may be expected to result from a sudden blow. The damage would cause the pointers to jump to a false reading, the pointers are therefore no indication of the actual height at which the crash occurred. It is unlikely that the setting of the ground pressure as shown on the subsidiary scale would be affected by the crash. There is no evidence to show that either instrument was not operating correctly up to the time of the crash."

4. *FURTHER ENQUIRIES*

(*a*) Examination of the flight records showed that in the 0800 hr. Croydon weather report two barometric pressures were given—one a Q.F.E. (pressure at airfield level) of 1027 mbs. (U.C.O. item No. 1) and the other an altimeter setting of 30.59 in. (U.C.O. item No. 4), *i.e.* pressure setting for altimeter to read airfield height on landing. Both readings were passed to the pilot by message pad slip after the millibar reading had been converted to inches (30.33 in.) by the radio operator. This conversion was necessary since the altimeters were not fitted with a millibar scale. The message slip was recovered from the aircraft and showed that these pressures were entered as " over field 30.33 in." and " sea 30.59 in." The 0830 hr. Croydon weather report gave similar barometric pressures. On this occasion it was only the 30.59 in. reading which was passed to the pilot. This message pad slip was also recovered but in a mutilated condition. The only indication of pressure on this slip was the figures " . . . . . 59 in." It was not possible to make out whether these figures had been prefixed as in the first slip.

(*b*) The pilot has stated that he intended to set his altimeter to read zero on landing at Croydon. The evidence shows, however, that he set it to the sea level pressure of 30.59 in. instead of the airfield pressure of 30.33 in. In consequence the aircraft's height above Croydon Airport would be approximately 230 ft. lower than the height indicated by the altimeter.

(*c*) The pilot had planned in the approach to Croydon Airport first to bring his aircraft immediately beneath the cloud base at 1,000 ft. at which height he expected to be able to see the ground through the gaps in the 2/10 cloud at 300 ft. and then to make a visual landing. This procedure required careful navigation to ensure that a close approximation to the aircraft's actual position was known at all times.

5. *CONCLUSIONS*

(i) The aircraft was serviceable on departure from Amsterdam and no trouble was experienced during the flight.

(ii) The licences of the crew were valid on the day of the accident.

(iii) The ground control organisation was satisfactory and all messages were passed promptly and accurately.

(iv) The pilot set his altimeter to the barometric pressure at sea level in the belief that this was the pressure reading at Croydon Airport level ; he was in consequence misled as to the actual height of his aircraft in relation to the airport and the surrounding country.

(v) The descent through cloud was made over high ground in a locality approximately 18 miles South West of Croydon Airport and in more adverse weather conditions than those at Croydon. The aircraft struck the ground at a place 637 feet above sea level.

(vi) The pilot was mistaken in the belief that he stopped descending at 1,200 ft. He knew the cloud base was 1,000 ft. in the

Croydon Airport area, and therefore it is reasonable to assume that, having made all preparations to land, he continued to descend in order to get below the cloud base.

6. *OPINION*

The accident was the result of flying into high ground in conditions of low cloud and poor visibility. This must be attributed to errors on the part of the pilot who, preparatory to landing at Croydon Airport in Q.B.I. conditions

(i) Failed to navigate his aircraft with a sufficient degree of care to avoid high ground when descending through cloud.
(ii) During the descent misinterpreted the height of the aircraft as indicated by his altimeter.

7. *COMPLIANCE WITH REGULATIONS*

In conducting this investigation the provisions of paragraph (2) of Regulation 4 of the Air Navigation (Investigation of Accidents) Regulations, 1922—Statutory Rules and Orders No. 650 of 1922—have been complied with.

Accidents Investigation Branch,
Ministry of Civil Aviation.
1st February, 1947.

VERNON BROWN,
Air Commodore (*Retired*)
Chief Inspector of Accidents

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