

No. 33

Transair Sweden A.B. (operating in the Congo under charter to the United Nations), DC-6B, SE-BDY, accident at Ndola, Federation of Rhodesia and Nyasaland on 17 September 1961. Report dated February 1962 released by the Director of Civil Aviation, Federation of Rhodesia and Nyasaland.

Circumstances

The aircraft, carrying the then Secretary-General of the United Nations, 10 other passengers and 5 crew, departed Leopoldville, the Congo, at 1551 hours GMT for Ndola in the Federation of Rhodesia and Nyasaland. Shortly after arriving in the vicinity of Ndola the aircraft crashed, at 2213 hours, in the bush 9-1/2 miles from the airport. All aboard the aircraft died as a result of the accident.

Investigation and EvidenceThe Aircraft

SE-BDY had been bought second-hand by Transair, and delivery of it was taken in the United States of America. On the morning of 17 September the aircraft left Elisabethville for Leopoldville. It was hit by bullets fired from the ground at Elisabethville. After a careful search at Leopoldville, the only damage found was to an exhaust pipe on one of the engines. This damage was repaired, routine pre-flight checks were carried out, and the fuel and oil tanks were filled. The fuel on board was sufficient to give the aircraft an endurance of approximately 13 hours. All the required inspections had been carried out, and all the modifications prescribed by the manufacturers and the Swedish Aviation Authorities had been put into effect. The aircraft was serviceable when it left Leopoldville.

Crew information

The crew was made up of three pilots, a radio operator and a flight engineer.

The flying experience of the crew was as follows:

	Total hours flown	Experience on DC-6 and DC-6B aircraft
Pilot-in-command	8 000 hrs	1 350 hrs
Co-pilot	2 700 hrs	720 hrs
Reserve captain	7 100 hrs	860 hrs
Flight engineer	1 370 hrs	1 370 hrs

The pilot-in-command was also a skilled navigator. The radio operator was aboard the flight as it was anticipated that the Secretary-General might require long-range communications.

Navigational aids

Non-directional radio beacons exist at Ndola, Abercorn and Kasama. The one at Ndola was in operation at all relevant times. Those at Abercorn and Kasama were switched off at 1600 hours as there had been no request to keep them on. It was not known in Salisbury that the aircraft would be on a route anywhere near Abercorn and Kasama until 2040.

All ordinary means of communication existed between the aircraft and Salisbury and Ndola, and these were effective until the aircraft reached Ndola and ceased to communicate.

Weather conditions

The last routine weather observation taken prior to the accident was made by the meteorological officer at Ndola at 1900 on 17 September. The weather was fine with slight haze and no cloud. Visibility was five miles and surface wind was 110°M with a speed of 10 kt.

Thirty-six minutes before the accident, at 2137, Ndola Air Traffic Control transmitted the following information to SE-BDY: surface wind 120M, speed 7 kt, QNH 1021 mb, CFE 877 mb. From visual reference Air Traffic Control also advised that visibility was 5 - 10 miles with slight smoke haze. At 2210 the QNH was again checked by the aircraft with Air Traffic Control, and a confirmation of 1021 mb was given.

It was a clear night, and the airport lights were clearly seen.

Preparations for the flight

The purpose of the trip to Ndola was a meeting between the Secretary-General of the United Nations and the President of Katanga. As part of the arrangements for the meeting, a DC-4, OO-RIC, was to leave Leopoldville for Ndola before SE-BDY and was then to depart Ndola for Salisbury prior to the arrival of the Secretary-General at Ndola.

Security measures were taken at Leopoldville to make it appear that OO-RIC was actually carrying the Secretary-General. Apart from the crew, few knew of the plans to use SE-BDY, and no one except the crew of SE-BDY appeared to have any knowledge of the route proposed or flight levels to be used.

Witnesses testified that, from discussions with the captain of SE-BDY, they had learned of his decision not to file a flight plan and to maintain radio silence throughout the flight for security reasons. Following a suggestion of the Air Traffic Control Officer, Leopoldville, the captain filed a departure plan for destination Luluabourg.

No evidence was found that any briefing was carried out at Leopoldville before departure.

There was no evidence that special security arrangements for SE-BDY were arranged. It was left unguarded for two

or three hours before departure. The main doors had been locked and the ladders removed.

OO-RIC did not take off until 1504, and the departure of the Secretary General was thereby delayed until 1551. After taking-off and clearing Leopoldville tower frequency, radio silence was apparently maintained until SE-BDY called Salisbury FIC at 2002, while still outside the FIR, and requested OO-RIC's estimated time of arrival.

Meanwhile OO-RIC had flown to Ndola via Villa Henrique de Carvalho in full radio contact and with navigation lights on throughout the flight. A normal flight plan was filed and a departure signal was made. The aircraft arrived at Ndola at 2035 without incident.

Reconstruction of the flight

The information available for a reconstruction of SE-BDY's flight was vague and incomplete. As stated, there were no communications recorded with the aircraft until it called Salisbury FIC at 2002. The aircraft gave Salisbury FIC its destination as Ndola and estimated time of arrival there as 2235 hours. It reported at 2040 to Salisbury that it was over Lake Tanganyika at 2035 and was flying on advisory route 432 at 17 500 ft to avoid Congolese territory. At 2049 the arrival time of OO-RIC at Ndola was passed to SE-BDY, and at 2108 the aircraft reported abeam Kasama at 2106, estimating Ndola at 2147, and requested permission to descend to 16 000 ft, which was granted. At 2115 SE-BDY was asked its intentions on arrival at Ndola but, apart from saying that it intended to take off almost immediately, no other information was given. At 2132 Salisbury FIC instructed the aircraft to contact Ndola on VHF 119.1. Radio contact was made with Ndola Tower at 2135 when the aircraft gave its ETA Ndola at 2220 hours.

At 2137 Ndola gave the aircraft the weather, the QNH and CFE settings and

asked at what time it wished to commence its descent. One minute later the aircraft requested descent clearance for 2157 and was given permission by the tower to descend to 6 000 ft on CNH and to report the start of its descent. SE-BDY reported abeam Ndola at 2147 and at 2210 reported "lights in sight, overhead Ndola descending, confirm CNH". This was done, and the aircraft was also asked to report when reaching 6 000 ft.

It would seem that the aircraft started its descent at 2157 and was at 6 000 ft when overhead Ndola. The aircraft's reference to "descending" at that time may well have related to the descent below 6 000 ft. Although requested to inform the control tower when reaching 6 000 ft, no such report was received, and there was no further radio communication with the aircraft.

The Commission considered the evidence showed that the aircraft approached at about the correct height above the airport in order to commence its landing approach (6 000 ft amsl - 1 840 ft above aerodrome level). It flew towards the Ndola non-directional radio beacon situated 2.5 miles west of the airport. Witnesses stated that it appeared to be lower than normal over the beacon area and beyond. Runway lights and high intensity approach lighting, set at maximum, were on at the time.

From the evidence it was concluded that the accident occurred at 2213 hours.

The Accident Site (see Figure 18)

The wreckage of SE-BDY was found early in the afternoon of 18 September, 9-1/2 miles short of Ndola Airport's runway, on a bearing of 280°T. It had hit trees at an altitude of 4 357 ft asl at a shallow angle when slightly turning to the left at normal approach speed. The swath cut in the trees gave a clear indication of the heading of the aircraft.

Ndola and its Airport

The land at the crash site is 4 300 ft asl. It then falls to 4 200 ft, rises again to a height which, from a very low altitude, would obscure the airport lights and then falls gently to the runway.

By air, Ndola is 970 NM from Leopoldville, 115 NM from Elisabethville, 230 NM from Kolwezi, 147 NM from Lusaka and 333 NM from Salisbury.

Ndola Airport has been a recognized airport for many years. It has a runway, which can be used by all aircraft except large modern jet aircraft. Its runway is 4 160 ft asl. The surrounding country on the whole is flat, but there are some small hills in the vicinity. Between the runway and the site of the crash, there is no significant change in the country.

The Approach Procedure - Ndola

The instrument approach procedure for Ndola consists of initial approach at 6 000 ft altitude on a track of 280° until 30 seconds after the NDB has been passed. The procedure turn is then made to the right at the same height. On completion of that turn and when on the inbound track of 100° to the NDB the aircraft descends to 5 000 ft over the NDB, thereafter descending to the critical height of the aerodrome.

Eyewitness evidence established that SE-BDY crossed Ndola Airport at about 6 000 ft altitude on a bearing close to 280°. It also established that the aircraft then turned to the right. As insufficient time elapsed, according to the evidence, between this turn and the crash, for the aircraft to have gone away for any substantial distance and then returned, the Commission was satisfied that the pilot continued his approach by a subsequent turn to the left to reach the place of the accident.

When the aircraft hit the trees it was descending at an angle of descent of

less than 5°, a normal angle. The fact that the nosewheel doors were not detached in the air by great speed indicates clearly that there had not been any considerable dive towards the ground followed by a flattening out to the angle of descent above.

Consideration of statements of the sole survivor

The sole survivor, who died later, was very incoherent. He seemed to think that what happened, happened as they were just about to land. He made reference to "great speed" of the aircraft. Considerable evidence indicated that SE-BDY was flying at a normal speed until it had passed over Ndola. Therefore, the great speed referred to could only relate to some time during the approach procedure. The impression of speed may have been given when the aircraft was passing through the tree tops. He also mentioned that there was an explosion and then a crash then later on said that there was a crash followed by an explosion. Undoubtedly, there was an explosion after the aircraft hit the ground. The possibility of an explosion causing the crash is discussed later on.

The survivor also said that Mr. Hammarskjöld "changed his mind or said 'Turn back'". Apart from anything connected with the crash, nothing indicated that Mr. Hammarskjöld was likely to have changed his plan to land. The first impact with the tree tops probably gave the impression to Mr. Hammarskjöld that there was some obstruction to the landing and he then shouted words such as "Go back".

The surgeon-in-charge said of the survivor that in view of his condition his statements were not necessarily correct and could only be taken as indicative.

Conclusions reached following wreckage examination

Following a survey of the accident site it was clearly shown that the aircraft hit trees at a normal angle of descent.

The measurement from the first tree damage to an anthill which the aircraft struck, and from which it cartwheeled to rest, showed an overall angle of 5° of descent. It is clear that with damage to the aircraft and loss of speed this angle must have been slighter initially. Therefore, it can be said that the trees were hit when the aircraft was descending at an angle of descent of less than 5°. There was no sign of fire except in the last 400 ft of the wreckage trail.

From the wreckage examination the following are some of the conclusions reached:

1. The engines were under power at the time of the crash.
2. The landing gear was fully lowered and in the locked position.
3. There was strong indication from the way in which the flap control quadrant was bent around its lever that there was 30° of flap at the time of impact.
4. Nothing was found to indicate that any of the controls were not operating before the accident. From the nature of the fire it was obvious that there was plenty of fuel.
5. The landing lights were not extended.
6. Examination of the radio equipment showed no apparent pre-accident failure.
7. Nothing was found to indicate that the altimeters were not operating properly before the accident. The barometric settings on the three instruments corresponded approximately to the setting given to the aircraft by the controller at Ndola.
8. Very careful examination of the wreckage was made to try to discover any sign of the aircraft having been hit by a bullet or other projectile.

Microscopic examination of the one hole found showed no presence of any metal foreign to the adjoining metal. A spectrographic examination disclosed no sign whatever that a bullet had come into contact with the metal. The hole might have been caused by the tearing out of a small bolt.

9. The plastic radar nose cone when first found did not show signs of penetration by any projectile.

The one possible examination which was not made was the remelting of all the fused metal recovered from the point where fire occurred in order to see whether any projectile could be found. The metal had all been broken by hammer and steam hammer into pieces about 8 inches square and a few inches thick. It was decided that the melting of all this wreckage was not justified.

In addition to examination of the actual scene of the accident a search was made of a large area over which the aircraft must have flown before the accident. Nothing was discovered which might have come from the aircraft. There was no sign of fire in the area.

Possible causes of the accident

Damage to SE-DBY at Elisabethville

The damage sustained at Elisabethville was not considered by the Commission to have contributed in any way to the crash.

Sabotage

The aircraft was in the charge of employees of Transair at Leopoldville except for a period when they went to lunch. During that time it was locked and the ladders were removed. This left the undercarriage wells accessible for the deposit of an explosive machine. Examination of the wreckage and the victims showed nothing to indicate that a bomb had exploded.

No one could have timed an explosion for arrival at Ndola when that destination was known to very few people, and no one except the pilots could possibly have known that the flight would last as long as it did, considering the route selected.

No grounds were found for attributing the accident to sabotage.

Route flown and crew fatigue

There was nothing to suggest that the security precautions had anything to do with the crash. The flight was made for the greater part by dead reckoning. The captain was an experienced navigator, and the route taken, via Lake Tanganyika, was not difficult to fly. Radar aboard the aircraft could have been used to determine when that lake was reached had visual conditions been difficult.

When the co-pilot boarded the aircraft in the afternoon, he indicated that he was tired. The captain appeared to be fit and relaxed before take-off. The flight to Ndola was long, but it should not unduly have tired a pilot. Some strain may well have been associated with the flight in that a most important person was aboard, and precautions had to be taken to conceal the route.

It was not considered that fatigue contributed to the crash.

Erroneous communication from the ground at Ndola

Nothing suggested that incorrect information was given to the aircraft, either by Salisbury or Ndola.

Use of inappropriate approach charts

Ndola - Ndolo

Pilots in Transair receive individual issues of the Jeppesen Manual containing approach charts. It includes one for Ndola showing the instrument approach procedure. One of these manuals was

found in the wreckage - the Ndola chart was missing. However, the chart needed for a landing is usually removed. In Leopoldville a bound manual of United States Air Force approach charts was freely available to pilots. Although Ndola has been an airport for years the 1961 issue contained no approach chart for it. However, it did contain a chart for Ndolo, an airfield which was abandoned for large aircraft in 1959. This airfield is located 6 miles from Ndjili Airport at Leopoldville; its elevation above sea level is 951 ft. Three of these manuals were found in the wreckage and one was found open, folded back and showing the Ndolo chart. Reference may have been made to it if the Ndola chart was not found in the Jeppesen Manual.

In one of the U. S. A. F. Manuals found, the elevation of Ndola Airport was written in green ink on the Ndolo page. There were also two barometric pressures, one the standard and the other the approximate figure for Ndola at that time of year. The book was sent to Sweden for comparison with the writing of the three pilots, but it did not correspond. It was accepted that the writing was not that of one of the three pilots.

It was not considered that the captain would have thought that the Ndolo chart applied to Ndola. A week before in Elisabethville, and shortly before he took off from Leopoldville, the captain discussed the elevation of Ndola and showed that he knew it was about the same elevation as Elisabethville, 4 187 ft. Apart from that, the Ndolo approach is shown as being from the opposite direction, with the beacon to the east and not to the west of the runway. The clearance to 6 000 ft by the controller, the sight of lights some 2 000 ft and not over 5 600 ft below him as he passed over the airport would have indicated to a pilot of his experience that he was not about to land at an elevation of 951 ft. Also, the instrument approach procedure for Ndolo is a descending procedure with passage over the beacon at 4 000 ft, losing height to 2 500 ft

on completion of the turn. Such an approach would obviously be impossible to an airport known to the pilot to have an elevation of over 4 000 ft.

If there was uncertainty with regard to the elevation of Ndola's runway it might be expected that an inquiry would have been made to the control tower. However, about a week before, the pilot, in conversation with a major at Elisabethville, had stated that he thought it quite unnecessary that the tower should remind a pilot of the airport elevation, or give certain other information.

The Commission did not consider that the pilots were misled by the Ndolo chart, but there may not have been a Ndola chart aboard the aircraft.

Mechanical failure

There was no indication that a mechanical failure of the aircraft caused or contributed to the accident.

Defective altimeters

The three altimeters were examined by the Civil Aeronautics Board and by the manufacturers in the United States of America.

There was nothing to indicate that any defect in the altimeters caused or contributed to the accident.

Internal fire during the flight

Two hand fire extinguishers discovered in the wreckage were in a discharged state. They could have been discharged in the fire on the ground, however, this could not be said with certainty. If fire occurred it must have occurred in the last few miles of flight. Post-mortem examinations indicated that among those persons on the flight deck and also among those in the cabin there were some with no carboxyhaemoglobin percentage. The percentage found in the bodies of the

pilots was such that they could not have been so affected by it as to be incapable of action. In these circumstances experienced pilots would have certainly taken obvious steps in case of fire.

If there had been a fire causing sudden explosion, so that either or both pilots were incapacitated or the aircraft was put out of control, it must have been of such a nature that some evidence would have been found on the ground, either at the wreckage site or in the other area searched.

There was no reason to suspect internal fire as the cause of the crash.

Incapacitation of the pilots

This was suggested as a possibility in the report of the Board of Inquiry. The Commission, however, could find nothing to support it.

All three pilots had passed the medical examinations. The possibility of incapacitation by natural causes of any of them was considered most unlikely. Post-mortem examination indicated no disease in any of the pilots. The chances of simultaneous incapacitation were, in the view of the Commission, so remote that that possibility was dismissed.

Action from the ground or by other aircraft

The possibilities of SE-BDY having been shot at from the ground or by another aircraft were carefully examined by the Commission, but no evidence was found to support either.

Pilot error

In support of the view that the Ndola instrument approach procedure was not carried out are the facts that the aircraft did not pass over the airport exactly on the course it should have taken as it proceeded to the non-directional radio beacon and for 30 seconds thereafter.

It flew over a house 3/4 of a mile to the north and slightly to the west of the beacon. At that stage, to make the amount of noise that one witness heard, it must have been below 6 000 ft, the correct altitude in an instrument approach. It then approached a house seven miles to the northwest of the airport. The procedure turn would not have taken it so far out, nor would the aircraft have appeared to be so low.

The Commission considered the evidence established that, whether or not the decision was influenced by chart manuals, the aircraft was being brought in by a visual descent approach procedure. It was a clear night, all the lights of the airport were at maximum intensity, the aircraft had reported that it had seen them and had been told that there was no other traffic.

The altitude of the aircraft as it crossed over the airport was considered by the Commission to be about 6 000 ft asl, based on the evidence of eyewitnesses. The absence of a report from the aircraft, as requested, on reaching 6 000 ft, may well have been because the aircraft had already reached that altitude when the request was made. It is certain that the aircraft started its descent soon after it passed over the airport.

In the country west of Ndola there is bush. After the lights of Ndola were flown over, and as the descending turn was made to the right, there would be blackness ahead. If, in the course of the turn, the aircraft came far too low, the slight rise in the ground between the place of the crash and the airport would obscure the lights of the runway and of Ndola as the aircraft came back to a course on which those lights might otherwise have been seen to port.

Failure to recognize the dangerous altitude of the aircraft in relation to the airport elevation, and the slightly higher elevation of some of the country to the west, is unexplained, in view of the apparent correct settings of the three altimeters

and the fact that, as far as can be determined, they were functioning properly.

Probable Cause

It was strongly urged that the Commission should not conclude that the accident was due to pilot error. Reasons have been given for saying that other suggested causes were not really possible.

Reasons have also been given for concluding that the approach was made by a visual descent procedure in which the aircraft was brought too low. It could not be said whether that came about as a result of inattention to the altimeters or misreading of them. The Commission felt it must conclude that the aircraft was allowed, by the pilots, to descend too low. In so doing, it struck trees and crashed.

ICAO Ref: AR/703

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The United Nations' Organization also held an investigation into the conditions and circumstances of this accident

The Investigation Commission, established in accordance with United Nations' General Assembly Resolution 1628 (XVI) of 26 October 1961, published a separate report of its findings regarding this accident in Doc A/5069. The Commission's conclusions as summarized in the Report are as follows:

Preparation for the flight

The Commission believes that the decision to leave for Ndola by air in the afternoon of 17 September 1961 was taken by the Secretary-General himself in view of the mission which he had to perform. In taking that decision the Secretary-General was fully aware that the flight would have to be carried out without escort and that most of it would be made by night. The Commission also believes that the crew of the aircraft chosen for the Secretary General was fully qualified

to undertake the flight, to navigate in radio silence and to land at Ndola in darkness. The Captain and the other crew members were experienced, competent and conscientious. No violation of the rules limiting flight hours of crew members appears to have been committed."

"The Commission is satisfied that the Secretary-General's aircraft had been properly maintained and was fully air-worthy. It believes, in particular, that the damage suffered by the aircraft at Elisabethville on the previous night had been adequately repaired. The Commission observes that no flight plan or departure message was communicated to the FIC at Salisbury. It is of the opinion that the situation created by the hostilities in Katanga, in particular by the activity of the jet aircraft equipped for aerial combat which was at the time in the service of the Katangese armed forces, explains this

departure from the rules applicable to international civil aviation."

"The Commission regrets, however, that before the take-off from Leopoldville, information was not given to a responsible official of ONUC* of the route which the pilot intended to follow. It also believes that special security measures should have been taken to guard the Secretary-General's aircraft at N'Djili airport before the take-off. Though it has no reason to believe that either of these omissions was a contributing cause of the crash, it considers that both were potentially dangerous."

Possible causes of the crash

"The Commission has carefully examined all possible causes of the accident. It has considered the possibility of sabotage or of attack and the material or human failures which could have resulted in an accident. It has found no evidence to support any of the particular theories that have been advanced nor has it been able to exclude the possible causes which it has considered. In this connexion it notes that the United Nations and the Swedish observers who participated in the work of the Rhodesian Board of Investigation also expressed the opinion that it was impossible to exclude any of the possible causes which they considered or to establish an order of priority among them."

"With respect to sabotage it has noted that the aircraft was without special guard while it was at N'Djili Airport in Leopoldville and access to it was not impossible. The Commission is aware that there are many possible methods of sabotage. No evidence of sabotage has come to its attention but the possibility cannot be excluded."

"The possibility of attack from either the air or the ground has also been fully examined. The Commission has found no evidence that an attack of any kind occurred."

It has also noted the opinion of experts that it is improbable that the plane would have been in the apparently normal approach position indicated by the crash path and wreckage analysis had it been under attack. Nevertheless, it cannot exclude attack as a possible cause of the crash."

"The Commission has also considered various possibilities of material failure, including technical or structural defects, altimeter failure or fire in flight. A thorough analysis of that part of the wreckage capable of being examined was made by technical experts, including members of the Rhodesian Board of Investigation and United Nations and Swedish observers. The altimeters were examined in the United States by the Civil Aeronautics Board and the manufacturer. No evidence of material failure of the aircraft was found, but this possibility cannot be excluded, mainly because of the destruction of a major part of the aircraft by fire."

"The Commission also considered various possibilities of human failure. It found no evidence that any of the pilots had been incapacitated. It cannot, however, completely exclude this possibility as some forms of incapacity might not be revealed by a post-mortem examination. It also considered various possibilities of pilot error, including the use of a wrong instrument approach chart or a misreading of altimeters. It noted that the Rhodesian inquiry, by eliminating to its satisfaction other possible causes, had reached the conclusion that the probable cause of the crash was pilot error. The Commission, while it cannot exclude this possibility, has found no indication that this was the probable cause of the crash."

"The Commission considered the possibility that during the course of a visual or semi-visual approach or through the use of an instrument procedure involving a descending turn, the aircraft might have come below the accepted safety

* United Nations' Organization in the Congo.

margin of 1 000 ft above ground level. On some landing charts, information concerning exact elevations in the approach area is not provided and should the aircraft have descended below the accepted margin a momentary distraction, either from inside or outside the aircraft, might have caused the pilot to lose the remainder

of his margin of safety. The Commission, however, has found no evidence that this could have been a possible cause of the crash. "

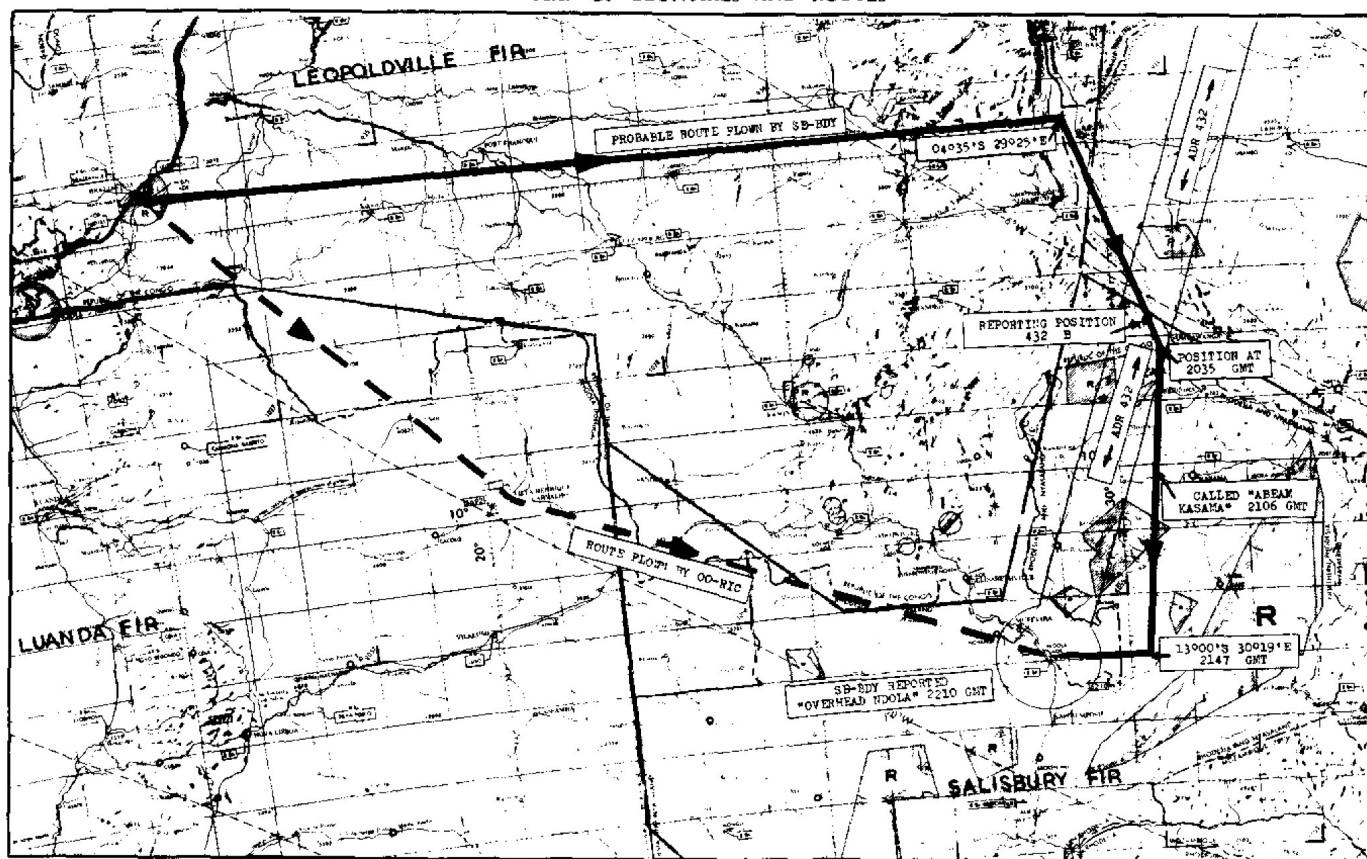
"The Commission considers it its duty to record that it has examined the various rumours that have come to its attention concerning the cause of the crash and has found no evidence in their support. "

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DC-6B, SE-BDY
17/9/61

MAP OF COUNTRIES AND ROUTES

FIGURE 18



No. 34

Starways Limited, Douglas Skymaster C-54A-DC (DC-4), G-ARJY
at Cloghran, County Dublin, Republic of Ireland, on 19 September 1961.
Report by the Inspector of Accidents (Ireland) released as C. A. P. 190
by the Ministry of Aviation (United Kingdom).

Circumstances

G-ARJY was flying a chartered non-scheduled trip from Speke Airport, Liverpool to Tarbes Airport, Lourdes where passengers were to embark for Dublin, Ireland. Following a normal flight to Lourdes the aircraft was refuelled. The amount taken on appeared to be sufficient for the flight to Dublin. The aircraft was carrying 4 crew and 69 passengers. Take-off for Dublin was at 1710 hours, and the flight to Dublin Approach was uneventful.

At 2035 the aircraft reported to Dublin Air Traffic Control and was informed of the local weather and of the runway in use. Subsequently, at 2058, it was cleared to land on runway 24, and the captain stated that he intended to make a visual approach. Shortly thereafter, at 2104 the flight reported having difficulty and that it was losing power. The captain abandoned the approach, swung the aircraft abruptly to the left and made a successful emergency wheels-up landing away from the airport. There was no fire. Although some occupants were slightly injured and shocked, there were no fatalities or serious injuries.

Investigation and EvidenceThe Aircraft

G-ARJY's certificate of airworthiness was valid until 3 July 1962. The certificate of registration, issued by the Ministry of Aviation (U.K.), was dated 17 February 1961.

Since manufacture, the aircraft had flown 31 458 hours.

The maximum take-off and landing weights for the aircraft were the same, i.e. 63 000 lb. At the time of the accident the approximate weight of the aircraft was 57 978 lb.

The Flight Crew

The crew consisted of the captain, a co-pilot and two stewardesses.

The captain's airline transport pilot's licence was valid at the time of the accident and was endorsed in Group 1 for DC-4 aircraft. His instrument rating was renewed on 19 August 1960. His last competency check was in May 1961.

His total number of flying hours amounted to 6 049. His experience on the DC-4 was as follows:

	<u>within the past</u> <u>90 days</u>
321 hours by day	224 hours by day
81 hours by night	56 hours by night
(356 hours in command)	(all in command)

The co-pilot's commercial pilot's licence was valid at the time of the accident. His last instrument rating was in October 1960, and his last competency check was on 24 April 1961.

He had flown a total of 14 000 hours on DC-4's, Vikings, Dakotas and military aircraft. His experience on the DC-4 was as follows: