File No. 1-0018

CIVIL AERONAUTICS BOARD

ACCIDENT INVESTIGATION REPORT

Adopted: October 31, 1957 Released: November 4, 1957

ALASKA AIRLINES, INC., DOUGLAS C 54B-DC, N 90449
NEAR BLYN, WASHINGTON, MARCH 2, 1957

The Accident

An Alaska Airlines Douglas C 54B-DC, N 90449, was totally destroyed when it crashed and burned approximately 3-1/2 miles east of Blyn, Washington, about 1719 P.S.T.,[1/] March 2, 1957. There were two passengers and a crew of three aboard the aircraft, all of whom received fatal injuries as a result of the accident.

History of the Flight

Alaska Airlines, Inc., is an air carrier certificated to conduct scheduled operations within the Territory of Alaska and between Alaska and the continental United States. Flight 100 of March 2 originated at Fairbanks, Alaska, as a regularly scheduled nonstop flight to Seattle, Washington. The aircraft, N 90449, had arrived from Seattle at 0717 March 2 as Trip 101/1. Two minor discrepancies reported by the inbound crew were corrected during a turnaround inspection and by 0930 that morning the aircraft was ready for the return flight to Seattle.

The crew assigned to Flight 100, Captain Lawrence F. Currie, Copilot Lyle O. Edwards, and Stewardess Elizabeth Goods, arrived at operations and made the normal routine preparations for the flight. The pilots discussed the flight with the station agent and all necessary flight papers were completed. Weather for the route was given to the pilots. The weight and balance were determined and both were well within allowable limits. The aircraft was serviced with 2,380 gallons of fuel.

The following IFR flight plan was filed with Fairbanks ARTC (Air Route Traffic Control): Alaska 100, a DC-4, departing 10,000 feet Amber 2 Snag, 12,000 Blue 79 Haines, 10,000 Blue 79 Annette, 9,500 direct Port Hardy, 10,000 Amber 1 Seattle; true airspeed 185; estimating 7 hours, 44 minutes en route; proposing 0955.

At 0940 the two passengers and crew boarded the aircraft. Takeoff was made in VFR weather conditions at 0958. Shortly thereafter Fairbanks center called N 90449 and relayed the ATC clearance, approving the flight plan as filed.

1/ All times herein are Pacific standard and are based on the 24-hour clock.

The weather conditions at Fairbanks and en route were forecast to be generally good and the flight proceeded in the clear as planned, making routine position reports as it progressed. At 1240, when over Haines, Alaska, at 12,000 feet, Flight 100 canceled its instrument flight plan and informed ARTC that they would proceed VFR to Annette and would file DVFR2/ (Defense Visual Flight Rules) after Annette and before entering the CADIZ (Canadian Air Defense Identification Zone). Thereafter the flight proceeded, reporting its position as DVFR at 1,000 feet. The flight was observed at Patricia Bay, British Columbia, at an estimated 3,000 feet m. s. l. by a tower operator. It was also observed leaving the CADIZ.

At 1717 the Alaska Airlines Seattle dispatch office received the following position report by radio from Flight 100: "Dungeness at 16 VFR estimating Seattle at 34." This was the last contact with the flight, which crashed shortly thereafter.

Investigation

N 90449 crashed in heavily timbered mountainous terrain March 2 and was not located until March 3, 1957. The crash occurred approximately in the center of the "on course" zone of the northwest leg of the Seattle low frequency radio range, about 11 nautical miles southeast of the Dungeness fan marker. This leg of the Seattle range defines the center of Amber Airway 1 between the Dungeness intersection and the range station. The minimum instrument en route altitude for this segment is 5,000 feet. Because of adverse weather and inaccessibility of the location, CAB investigators were unable to reach the scene until March 6. The investigators noted that the wreckage had been disturbed prior to their arrival; some components were missing, presumably carried away by persons unknown.

The path of the aircraft during the final seconds of flight was clearly defined in the heavy timber growing on the steep slope against which the aircraft smashed. The aircraft's first contact with the trees was at a point 650 feet from the wreckage. From this point it cut a level swath on a heading of 106 degrees magnetic, the width of its wing span, into the steeply rising wooded slope at an elevation of approximately 1,500 feet m. s. l. The terrain immediately ahead of the aircraft's path rose to an altitude of 2,000-2,100 feet m. s. l. (mean sea level).

The airframe and powerplants were severely damaged as a result of impact followed by intense fire. The wings were torn from the fuselage in its passage through the heavy timber. Parts were scattered from the point of initial contact with the trees along the entire flight path, and as much as 75 feet beyond the main wreckage area.

All four engines and the main landing gears were wrenched from their positions in the wings. Ensuing fire gutted a major portion of the fuselage remaining and contributed extensively to the damage of other parts.

2/ A clearance, which is designated as DVFR is required before entering an Air Defense Identification Zone when VFR.

All control surfaces and their trim tabs were accounted for. However, continuity of controls could not be established because of the severe damage due to impact and fire. Small portions of the rear main spars for both outer wing panels were recovered with the attachments to the center section spars intact. A section of the left wing, with its flap attached, was found. The flap and its actuating strut were in the full retracted position. Only small fragments of the right wing flap were located, from which no significant determinations could be obtained.

All major components of the landing gear were located. It was possible to establish that the right main gear was retracted. Damage to the nose and left main gear was so extensive that a positive determination of their positions was impossible.

The nose and cabin heaters were recovered and examined for possible malfunction. No stains or indication of leakage of combustion fumes or fuel were evident. All damage to these heaters appeared to be the result of impact.

The empennage, which was almost completely destroyed by the crash, and various other parts of the aircraft were strewn along the flight path from the initial point of contact. The copilot's instrument panel was found relatively undamaged. Subsequent to the accident and prior to the arrival of CAB investigators at the scene, all the instruments had been removed from the panel and stolen by vandals.

The aircraft structure and components which were recovered for examination were damaged as a result of contact with trees and the ground, or by the intense fire which followed the crash. There was no indication of any malfunction or mechanical failure prior to impact.

Complete airframe and equipment maintenance records for N 90449 were carefully scrutinized. These records included, among others, all pilot discrepancy reports, time inspection sheets, maintenance sheets, work sheets, and reports of radio equipment discrepancies. It was determined that all discrepancies had been corrected, all required inspections had been made, and that the airframe and all of its equipment had been maintained in an airworthy condition.

An examination of the powerplants was made. All four engines and the major portions of the propeller assemblies were recovered at the site. The engines were separated from the airframe and sustained heavy damage. The propeller assemblies of all four engines were broken from the power cases. Most of the cowling was stripped from the engines and fell outside of the ground fire area. These pieces of cowling showed no signs of fire in flight. Molten metal flow from engine and structure parts, which were subjected to the intense ground fire, indicated that no inflight fire occurred and that all the burning occurred after the aircraft came to rest.

The examination of the powerplants revealed no evidence of internal failure prior to impact. In the parts available for examination, no internal metal contamination, oil starvation, or mechanical defect was found.

When the propellers were disassembled, the dome rotating cams of Numbers 1, 2, and 3 were found to be 41 degrees, 43 degrees, and 41 degrees, respectively.

The No. 4 propeller dome assembly, distributor valve, and front barrel half had been disassembled and the propeller retaining nut mutilated prior to the arrival of the CAB investigators at the scene. The propeller blade shim plates for all engines were damaged in varying amounts. Many were broken and unreadable. On those which were readable the deformation due to impact loading indicated blade angles at impact from 35 degrees to 43 degrees. The minimum and maximum angles were obtained from shim plates on Numbers 4 and 3 propellers, respectively. Engine maintenance and overhaul records were analyzed. All discrepancies had been properly corrected. All inspections and overhaul procedures were complete and properly conducted.

All Airworthiness Directives had been complied with for N 90449. In short, the research indicated that the aircraft had been maintained according to approved schedules and standards and was in an airworthy condition at the time of dispatch.

The investigation by the operations group was extensive. Aircraft logs, flight records, weather records, radio communications, and company records were researched minutely. Flight records recovered from the wreckage indicated that the necessary documents had been completed during routine preflight preparations. It was noted that the altitudes at which the flight was flown and other inflight data required by the company were not recorded on the pilots' flight log. The operations agent at Fairbanks had discussed the flight altitudes with the crew, however, and had filed a flight plan specifying the altitudes agreed upon.

At the time of departure a deep low was centered in the Bering Sea and extended eastward to the Fairbanks area. A ridge of high pressure existed along the west coast of Canada. Another ridge of high pressure extended from a high off Southern California northeastward into west Oregon. A weak low level trough extended approximately east-west through the accident area connecting a low pressure cell in Montana with a front approximately five degrees of longitude west of the coast of Washington.

The Seattle terminal weather at the estimated time of arrival of Flight 100 was forecast to be scattered to broken clouds at 3,500 feet. The weather for the northwest Washington area from 0500-1700 was forecast to be clouds at 12,000 feet scattered to broken in extreme northwestern Washington, with scud spreading northward across northwest Washington by 0930.

One of the pilots studied weather information available in the Weather Bureau office at Fairbanks. This material included: Surface weather charts, upper air constant level charts, upper winds, hourly reports and forecasts. The pilot requested little assistance from the forecaster who subsequently described the briefing as the "self help" variety. He recalled saying to the pilot, "It looks like you will have a good trip. The weather is mostly clear all the way. Winds are rather strong from a southerly direction from here (Fairbanks) to Big Delta and a little beyond, and it will be cloudy down around Seattle."

Recordings of radio contacts with Flight 100 as it progressed toward Seattle were studied. The flight canceled its IFR clearance at Haines, Alaska, and continued VFR. From this point to Annette, it reported being VFR. Company

operating procedures for day VFR passenger operations provided that no aircraft be flown at an altitude less than 1,000 feet above the surface or less than 1,000 feet from any mountain, hill, or other obstruction to flight. As a result of this accident the company procedures were revised to require that all flights, IFR or VFR, be conducted at or above the IFR minimum en route altitude. It was also made mandatory that altitude be reported on VFR flights.

At Annette, Alaska, a DVFR clearance was obtained for penetration of the CADIZ and the Western Security Identification Zone. According to company witnesses, a flight into a defense zone is required to report cruising altitude as above mean sea level and that the reports from Flight 100 at 1,000 DVFR would indicate that, unless the flight was over water or very low terrain, it was violating the company minimum en route altitude rule.

A direct course from Annette to Pt. Hardy and thence via Amber 1 to Patricia Bay passes directly over terrain which rises to an elevation of several thousand feet. In point of fact, the minimum en route instrument altitude over portions of this route is as high as 8,000 feet.

A position report was transmitted from N 90449 in which the aircraft's position was declared as being 30 miles west of Comox, B. C., at 1636 at 1,000 DVFR. Information received from the Department of National Defense, RCAF, detailed radar plots of the plane's position in the vicinity of Comox. At the same time, 1636, this radar system had plotted N 90449's position 10 miles south of Comox at an altitude of 2,500 feet m. s. l.

The final transmission received from Flight 100 shortly before the crash was a normal routine position report stating that the flight had passed over the Dungeness fan marker at 1716 VFR. Company employees identified a recording of this transmission as being in the voice of Captain Currie, which they recognized.

Several ground witnesses in the vicinity of Dungeness observed the aircraft just prior to the crash. All of these witnesses stated their attention was drawn to the airplane because of its unusually low altitude. One ground observer reported that the aircraft flew through several low clouds and disappeared into an overcast estimated to be about 1,000-1,500 feet high and which obscured the tops of the surrounding hills. Several seconds later this witness heard and felt an explosion. He said because considerable blasting is done in that area he did not associate the noise with an aircraft accident until later when he heard a report of the accident.

All of these witnesses described a low overcast lying to the south and southeast of Dungeness; also, that some scattered scud existed at about 1,000 feet and thickened to form a low scud ceiling between Sequim and Elyn, Washington. Approximately one hour after the aircraft was reported as missing, a Coast Guard helicopter attempting to search along the proposed flight path reported that the cloud level dropped to the water along a line from Sequim Bay and Port Townsend across to Fort Casey on Whidbey Island.

Investigation disclosed that Alaska Airlines conducts a continuous training program to maintain pilot proficiency and to keep them current on all regulations and policies. Both pilots had been in the employ of Alaska

Airlines for many years and according to their respective route checks were well qualified over the route involved. Also, both were proficient in the aircraft involved and had received training in the flight simulator. Prior to the subject flight they had received a rest period of 26 hours, 28 minutes.

Analysis

Nothing was found in the course of the investigation to indicate any mechanical difficulties during this flight. All maintenance had been performed as required. Enough parts were recovered at the wreck to determine that the aircraft had been intact prior to the initial contact with the trees.

Damage to the propeller blade shim plates precluded precise determination of the blade angles which they indicated, and thus accounts for the variation recorded. These values and the blade angles indicated by the dome positions are quite conclusive that substantial power was being produced by all engines and that the airplane was being operated in the cruise configuration.

All the witnesses stated that the airplane appeared to be in normal flight and none noted anything unusual about the engine sound. In addition, the flight had been in regular radio contact with numerous ground stations over the entire route and had ample opportunity to report any malfunction or emergency encountered. Also, if any such difficulty had arisen, the crew was obligated to inform the company. No such report was received. Further, a normal routine position report was received by AIRINC (Aeronautical Radio, Inc.) only minutes before the crash. Had there been anything amiss with the flight it most certainly would have been reported at this time. From all of these reasons, the Board considers it reasonable to presume that no inflight emergency existed and that the aircraft was operating normally until it struck the mountain.

There were several facts disclosed by the investigation which are significant and relate to the operational quality of the flight. First, Captain Currie had not properly completed his flight log. Company regulations require that this form, which is the only inflight record from the crew, be filled out completely while en route.

Secondly, along the route segment from Pt. Hardy to Patricia Bay, Captain Currie reported his altitude as 1,000 feet. In order to have been at its reported altitude of 1,000 feet, the flight path of the aircraft would have had to follow a meandering course over water at times as much as 25 miles north of Amber Airway 1. Radar determination and qualified eyewitnesses placed the aircraft approximately on the airway and at an altitude of 2,500-3,000 feet m. s. l. It is, therefore, obvious that Captain Currie was reporting his flight altitude in feet above the ground which was incorrect since he was obligated to report altitude as above m. s. l. The captain had flown this route for a considerable length of time and knew, or should have known, the ADIZ regulations requiring that altitude be stated as above mean sea level.

Thirdly, in one of Captain Currie's reports he gave his position as being 30 miles west of Comox, B. C. At that instant, RCAF radar showed him to be 10 miles south of Comox. We have been unable to rationalize this report with Captain Currie's known position and the Board can, therefore, only believe

that Captain Currie was not aware of his precise position. It also indicates to the Board that Captain Currie did not properly utilize the facilities he had available to determine his position.

Fourthly, eyewitnesses in the Dungeness area saw the aircraft underneath an overcast and at an estimated altitude of 1,000-1,500 feet. These witnesses all described a distinct line of clouds below this overcast and lying directly across the flight path ahead of the aircraft. These clouds were described as obscuring the tops of foothills which rose to an altitude of about 2,100 feet ahead of the plane. Two of these witnesses stated the aircraft entered these clouds.[3/] Civil Air Regulations require that a pilot, when about to enter instrument conditions, request an Air Traffic Control clearance prior to flight in controlled airspace.[4/] He is required to maintain VFR until that request is approved and the appropriate ATC clearance is issued. Captain Currie did not request an IFR clearance but continued directly into clouds.

It is the opinion of the Board that these incidents indicate that the conduct of the entire flight was haphazard and certainly not equal to that expected from an airline captain.

In its efforts to determine the cause of this accident the Board studied the terrain in the area between Dungeness and Seattle. This route segment of Amber Airway 1 passes over the Miller peninsula which is located between two bays three to four miles apart on the southern shore of the straits of Juan de Fuca. While these two bays do not appear to be similar when projected on a chart, it is believed possible that at low altitude and in a slightly hazy atmosphere a pilot, in a casual glance, seeing only one or a portion of one of these bays, could mistake it for the other.

It was found that if Flight 100 had been approximately three miles east on a parallel course it would have passed over Port Discovery, the more eastern bay. It was also noted that the terrain over which the flight would have flown on the way to Seattle was much less than 1,000 feet. It was further noted that the terrain between Washington Harbor, the more western bay, and Seattle rose to an altitude of about 2,100 feet, a fact of which Captain Currie was undoubtedly well aware.

It is therefore considered probable that Captain Currie mistakenly identified Washington Harbor as Port Discovery and thinking he was three miles east of his actual position entered the overcast at an altitude which he thought was sufficient to clear the ground. The Board is constrained to consider that the laxity and inattention exhibited by the crew throughout the flight, and the fact that the aircraft was flown into instrument conditions without an appropriate clearance, lend substantial credence to this presumption.

Findings

On the basis of all available evidence the Board finds that:

1. The aircraft and crew were currently certificated for the subject flight.

3/ CAR 41.114 (b).
4/ CAR 60.10, 60.30 (b), 60.31 (c), 60.40, 60.43.

2. The aircraft had been maintained in an airworthy condition.

3. No malfunction or emergency existed and the aircraft was intact prior to its initial contact with the mountain.

4. Several errors and omissions in the course of the flight indicate the crew was lax and not giving proper attention to their duties.

5. A navigational error resulted in the aircraft being three to four miles west of the flight path assumed by the crew.

6. The pilot flew into instrument weather without obtaining a proper clearance.

7. The aircraft crashed in terrain obscured by clouds.

Probable Cause

The Board determines that the probable cause of this accident was a navigational error and poor judgment exhibited by the pilot in entering an overcast in a mountainous area at a dangerously low altitude.

BY THE CIVIL AERONAUTICS BOARD:

/s/ JAMES R. DURFEE

/s/ CHAN GURNEY

/s/ HARMAR D. DENNY

/s/ G. JOSEPH MINETTI

/s/ LOUIS J. HECTOR

SUPPLEMENTAL DATA

Investigation

The Civil Aeronautics Board was notified that the aircraft was overdue shortly after its estimated time of arrival in Seattle. An investigation was initiated immediately after the wreckage was located in accordance with the provisions of Section 702 (a) (2) of the Civil Aeronautics Act of 1938, as amended. Depositions, ordered by the Board, were taken at Seattle, Washington, on May 2 and 6, 1957, and at Sequim, Washington, on May 7, 1957.

Air Carrier

Alaska Airlines, Inc., is incorporated under the laws of the Territory of Alaska and maintains its principal place of business at Anchorage, Alaska. The company possesses a current temporary certificate of public convenience and necessity issued by the Civil Aeronautics Board and an air carrier operating certificate issued by the Civil Aeronautics Administration which authorize the carriage of persons, property, and mail over the route described in this report.

Flight Personnel

Captain Lawrence F. Currie, age 41, was employed by Alaska Airlines April 1, 1943. His flying hours totaled 12,033:11, of which 8,023:04 were in DC-4 equipment. Captain Currie held a valid airman certificate with an airline transport rating and type ratings in C-46, DC-3 and DC-4 aircraft. His last 6-month instrument check was passed on December 22, 1956, and his last route check was August 8, 1956. He passed his last first-class physical examination on November 24, 1956.

Copilot Lyle O. Edwards, age 39, was employed by Alaska Airlines on June 26, 1947. His flying hours totaled 10,791:51, of which 4,532:20 were in DC-4 equipment. Mr. Edwards held a valid airman certificate with an airline transport rating and type ratings in C-46, DC-3 and DC-4 aircraft. His last 6-month instrument check was passed on October 4, 1956, and his last route check was October 5, 1956. He passed his last first-class physical examination July 25, 1956.

Stewardess Elizabeth Goods was employed by Alaska Airlines November 1, 1956. She completed her training period November 30, 1956, and was assigned to flight duty.

The Aircraft

Douglas C 54B-DC, N 90449, serial number 27239, was manufactured December 12, 1944. Flying hours on the aircraft totaled 28,835:53. A continuous maintenance program was conducted by Alaska Airlines for the aircraft and all pilot reports and scheduled time inspections had been made and all discrepancies affecting its airworthiness had been corrected. The aircraft was equipped with Pratt and Whitney R-2000-7M2 engines and Hamilton Standard propellers, model 23E50-505, with model 6507A-0 blades.