No. 26

Canadian Pacific Airlines, Ltd., Douglas DC-6B, CF-CUP, crashed following a missed approach at Cold Bay Airport, Cold Bay, Alaska on 29 August 1956. Civil Aeronautics Board (USA) Accident Investigation Report SA-321, File No. F109-56 released 9 May 1957

Circumstances

Flight 307 departed Vancouver, British Columbia at 1347* hours Bering standard time en route to Hong Kong, China, with a refueling stop at Cold Bay, Alaska and an intermediate stop at Tokyo, Japan, carrying a crew of 8 and 14 passengers. At 2011 the flight reported 100 miles out, estimating Cold Bay at 2036. It reported being over the Cold Bay range station outbound on a standard instrument approach at 2035, and at 2042 as completing a procedure turn and proceeding inbound. This was the last transmission from the flight. At 2045 the aircraft was observed to descend from the overcast north of the airport for a landing on runway 14 and cross the field at low altitude to the intersection of the two runways. At this point a shallow left turn was started and the aircraft went out of sight southeast of the airport. Shortly afterwards a fire was observed and it was ascertained that the aircraft had crashed. Eleven passengers and 4 crew members were fatally injured. The aircraft was destroyed by impact and fire.

Investigation and Evidence

Examination of the wreckage and ground marks disclosed that the aircraft first struck the ground at an elevation of 10 feet on a heading of approximately 40 degrees magnetic and 4 300 feet east-southeast of the approach end of runway 26. The physical evidence indicates that at the time of impact the aircraft was descending in a slightly nose-down attitude with the left wing down about 15 degrees. Computed ground speed at impact was approximately 186 knots.

There was no indication of inflight structural failure or malfunction of the engines, propellers, or their related accessories. Examination revealed that the blades of all propellers were at a blade angle of approximately 40 degrees and that the engines were operating at an average speed of 2 460 r.p.m. at the time of impact. Computations show that each of the four engines was delivering approximately 1 385 horsepower at impact, which is slightly more than cruise power. Landing gear and flaps were determined to be in the retracted position at the time of impact.

The Canadian Pacific Operations Manual specifies that in the case of a missed approach, METO (maximum except take-off) power is applied, the gear is retracted, and the flaps are retracted to 20 degrees for the climbout. METO power of the aircraft involved was 1 900 h.p. and 2 600 r.p.m.

Ground witnesses testified that the aircraft, during its pass over runway 14, was flying at an estimated altitude of 100 - 200 feet above the ground, with the landing gear down, and landing lights on.

The company dispatcher, standing on the ramp east of runway 14, observed Flight 307 break out of the overcast, appear to be making a landing, and then he heard power applied. He next observed the aircraft turn to the southeast over the intersection of runways 14 and 26 in a shallow climb from its estimated height over the runway of 50 to 75 feet. The dispatcher held a microphone for VHF radio contacts with the flight and was on the point of asking if the pilot wanted the lights switched to runway 26 when he saw fire at ground level.

The surviving stewardess testified that she saw the runway lights a short time before the crash. None of the crew survivors recalled any aircraft operating difficulties prior to the impact. One flight crew member, who was resting in a crew sleeping compartment at the time of the accident stated that the approach from over the range station did not seem as smooth as usual, the power was changed frequently during the descent, and that the power applied for a missed approach seemed less than normal. He also said that he thought there was a feeling of "sink" just before the ground contact. The duty navigator stated that when power was being applied over runway 14 he observed a reading of 160 feet on his altimeter. This altimeter was set at 29.92 inches, which produced a reading approximately 30 feet higher than true.

* 1747 Pacific daylight time

The Cold Bay Airport is located on the Alaskan Peninsula, 572 miles southwest of Anchorage, Alaska. Its elevation is 93 feet. The two runways are 7 500 and 5 000 feet in length and their intersection is on the south side of the airport. The control tower was not operative and there was no CAA Communications Station available. There were two private air-ground communications stations on the airport operated by Reeve Aleutian Airways and Northwest Orient Airlines. CPA utilized the facilities of Northwest to relay position reports, and to receive traffic clearances, weather information, and local traffic conditions.

Navigational facilities in operation at Cold Bay consisted of a low frequency range without voice, equipped with a VHF station location marker. The range is located 2.2 miles northwest of the airport. A privately owned (Reeve) nondirectional beacon is located off the approach end of runway 14 and is operated on request only. Such a request was not made by Flight 307. The low frequency range was flight-checked following the accident and found to be operating within allowable limits.

The airport is equipped with a rotating beacon and high-intensity runway lights that can be operated on only one runway at a time. During Flight 307's approach, the high-intensity runway lights were lighted on runway 14, as were the high-intensity approach lights to the runway. Runway 14 lights, and all other lights, were reported to have operated normally the evening of 29 August. In the vicinity of the airport, and in the quadrant in which the aircraft was flying when the accident occurred, there were few, if any, lights which would assist in orientation.

The ceiling and visibility landing minima for Canadian Pacific Airlines DC-6 flights at Cold Bay are 400 feet and one mile for straight-in approaches at night, and 500 feet and 1-1/2 miles for circling approaches.

The weather briefing received by the crew of Flight 307 at Vancouver included a forecast for Cold Bay for the period 1200 to 2200, 29 August, as follows: Ceiling 800 feet, overcast; visibility 3 miles; light drizzle and fog; wind west 16; after 2000, ceiling 1 200 feet, overcast; visibility 7 miles; wind northwest 12.

The actual weather en route appears to have been quite close to that forecast at the briefing, with the exception of the lower ceiling at Cold Bay. The 2024 Cold Bay report was: indefinite ceiling, 500 feet, sky obscured; visibility 1-1/2 miles; light drizzle, fog; temperture 47; dewpoint 46; wind west-northwest 21; and altimeter setting 29.89. This report was received by the flight before the arrival at Cold Bay.

It is probable that the intention of the pilot during the approach was to land on runway 14, a straight-in landing from the inbound overheading of the range station. The breakout, after descending through the overcast, may have been too close in and high and these factors, together with excessive groundspeed due to a quartering tailwind, may have caused the captain to decide to go around.

Whether the flight intended to turn and climb to 2 700 feet on the north leg of the Cold Bay range, as the missed-approach procedure prescribes, or to circle under the 500-foot ceiling and land on another runway is not known. However, the company dispatcher, who observed the aircraft and was in radio contact with it, thought the decision was for the latter course.

Considering that very little altitude was gained after the application of power it is probable that a circling approach had been decided upon when the left turn from runway 14 was made.

Since the wing flaps during the circling approach would be extended 20 degrees, and since they were found in the fully retracted position, it is believed that they were retracted shortly before impact. Fully retracted wing flaps at this time would explain the feeling of "sink" experienced by the off-duty flight crew member.

The Board believes that the airspeed of the aircraft at the time the flaps were retracted was approximately 130 to 140 knots. This is supported by several facts. According to company procedure it is normal on the downwind leg of an approach to a runway for the aircraft to fly at an airspeed of approximately 140 knots with wing flaps extended 20 degrees. Since the subject aircraft was in a clean configuration (gear and flaps up) immediately prior to the accident, with a tailwind of approximately 20 knots, it would be reasonable to assume that

the speed of the aircraft increased during the final descent. In addition, when the aircraft passed over runway 14 it was in landing configuration. Since only slightly better than cruise power was applied at this time, and as the distance to the point of impact was approximately one mile, it is unlikely that the speed of the aircraft would have been much greater than 140 knots when the flaps were retracted.

It is evident that the aircraft struck the ground while descending in a slight left turn and while all four engines were not operating at the prescribed power settings necessary to execute a missed-approach procedure.

Probable Cause

The probable cause of this accident was the full retraction of the wing flaps at low altitude during a circling approach without necessary corrective action being taken by the crew.

Fire Aspects - Excerpt from NFPA Aviation Bulletin No. 190 dated July 1957.

Following a missed approach at an island refueling stop, this DC-6B crashed and burned in a tidal flat area about 7 200 ft. from the end of a runway. The contact with the ground was at a high rate of speed as the pilot was apparently attempting to "go around" for a second landing attempt (gear and wing flaps having been retracted following the initial missed approach).

The DC-6B literally disintegrated at impact, the wreckage consisting of the following sections: (1) remains of the center section and wings which burned furiously; (2) a small bit of aft fuselage; (3) a small bit of nose; and (4) countless small pieces along the path the aircraft took for a distance of approximately 2 000 feet. An initial flash fire occurred followed by a mushroom topped column of flame which rose to approximately 200 ft. When rescue personnel reached the scene (about 40 volunteers) the center section and wings were still burning and an oil tank exploded during the rescue operations. No fire fighting equipment was available at the site.

Fifteen of the 22 persons aboard perished. Of this number, 14 had no burns and only 1 had minor burns so it is felt that all died of impact injuries. Three of the 7 to escape, escaped unaided and the other 4 were rescued, only 1 having burn injuries. It is clear that this result was largely influenced by the impact disintegration effects. Four of the survivors were in the separated small aft section which was totally clear of the fire area. Three of these got out by themselves through an emergency exit while the fourth was helped out. Two flight crew members were found in ankle deep water along the shore having been thrown out - one sitting and the other standing. Both of these were helped to safety having suffered serious injuries. Another crew member was removed from the small separate piece of nose and this crew member also had been seriously injured. Thirteen of the dead were found along the wreckage path, two or three near the center section; one body was removed from the small nose section and the body of one infant could not be found.

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