

## CIVIL AERONAUTICS BOARD

## AIRCRAFT ACCIDENT REPORT

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**ADOPTED:** September 17, 1963**RELEASED:** September 19, 1963

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NORTHWEST AIRLINES, INC., DC-7C, N 285,  
DITCHING IN SITKA SOUND, ALASKA, OCTOBER 22, 1962

SYNOPSIS

A Northwest Airlines DC-7C, N 285, was ditched near Biorka Island, Sitka Sound, Alaska, on October 22, 1962, about 2052 G.m.t. All 95 passengers and 7 crew members successfully evacuated and were quickly rescued. No serious injuries were reported.

The flight was operating as Military Air Transport Charter Flight No. 293 en route from McChord Air Force Base, Tacoma, Washington, to Elmendorf AFB, Anchorage, Alaska. While cruising at an altitude of 20,000 feet No. 2 engine lost power. Remedial measures failed, the propeller oversped and the engine seized. Attempts at feathering failed and the flight radioed a declaration of emergency and started descent toward Sitka Sound, Alaska. Other futile attempts were made to feather as the No. 2 engine became dangerously hot and shed parts. The captain elected to ditch. Passengers were moved aft and away from the plane of rotation of No. 2 propeller, crew members issued ditching instructions, and occupants and flotation gear were readied. The aircraft was put down skillfully under favorable conditions of weather and sea during daylight, and all occupants were quickly in liferafts. Previously alerted marine craft were nearby and took all hands aboard. Amphibious rescue aircraft were also close by. The aircraft sank in water 250 feet deep in about 24 minutes.

The Board determines that the probable cause of the accident was an uncontrollable overspeeding propeller due to failure in the blower section of No. 2 engine.

Investigation

A Northwest Airlines DC-7C, N 285, operating as Military Air Transport Service Charter Flight No. 293, was ditched in Sitka Sound, Alaska, about one mile off Biorka Island, on October 22, 1962, at 2052 G.m.t.<sup>1/</sup> There were no fatalities, and no serious injuries were reported to Board personnel by any of the 95 passengers or by any of the 7 crew members.

The flight was planned nonstop from McChord AFB, Tacoma, Washington, to Elmendorf AFB, Anchorage, Alaska. The crew consisted of Captain Vinton R. Hanson, Check Pilot Francis H. Kellogg, First Officer Earl C. Perry, Flight Engineer Donald E. Hackett, Steward Richard D. Chinnock, and Stewardesses Ruth E. Fullerton and Kathryn E. Ollinger.

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<sup>1/</sup> All times herein are Greenwich Mean based on the 24-hour clock.

The crew arrived at the Seattle-Tacoma International Airport early in the morning of October 22. They planned the flight, checked the weather at the company's dispatching office, and reviewed ditching procedures at this airport. The crew then went by taxicab to McChord AFB.

At McChord the captain filed an Instrument Flight Rules (IFR) flight plan requesting a cruising altitude of 14,000 feet and indicating an estimated flight time of 5 hours and 16 minutes. The gross weight of the aircraft was computed as 125,340 pounds (maximum permissible for takeoff was 127,070 pounds) and the center of gravity was located within prescribed limits.

Flight Engineer Hackett conducted a preflight inspection of the aircraft. The engine pre-takeoff checks indicated that the powerplants, including the propellers, were functioning satisfactorily.

Takeoff was at 1658, and the aircraft was climbed continuously to its planned 14,000-foot cruising altitude. Cruise power was established and the aircraft proceeded on course.

Approximately two hours after takeoff and some 40-50 miles past Sandspit, British Columbia, the flight encountered light to moderate icing conditions in clouds. Induction system icing caused fluctuations in the Brake Mean Effective Pressure (BMEP) and Manifold Pressure (MAP) gauge readings of all engines, and ice collected on the airframe. Use of carburetor alcohol proved adequate to cope with the engine icing. However, because of the ice accumulation on the airframe, Sandspit Radio was asked for weather information. Sandspit replied that other aircraft had reported ice at 8,000 to 10,000, 14,000 and 16,000 feet, light ice at 18,000 feet and no ice at 20,000 feet.

Upon receipt of this information, at 1944, the flight requested a change of altitude to 20,000 feet. This was approved, the engines were placed in high blower, and climb was started. Shortly thereafter Maximum Except Takeoff (MEFO) power was used because of ice on the aircraft. During its 1952 report by the Domestic Annette Intersection, a compulsory reporting point, the flight reported its altitude as 20,000 feet. At this time the flight was still in the clouds.

Immediately after reaching 20,000 feet the flight engineer started adjusting settings for cruise power. He changed the settings for No. 1 engine, then No. 4, and was about to start on No. 2 engine when it lost power. This loss of power was initially from 172 BMEP to 80 and then to 50, the lower limit of the indicator. However, the ignition analyzer showed no breakdown in combustion. Believing the trouble was due to carburetor icing, the flight engineer and the copilot applied alcohol and heat, first separately, then together, but these actions were ineffective. Since the other engines were operating normally the flight engineer then used emergency fuel enrichment to restore power in the No. 2 engine. This action also was ineffective, and at this time he observed the No. 2 propeller starting to overspeed. This happened an estimated 30-60 seconds after the initial power loss. He immediately tried to feather No. 2 propeller, but it would not feather. The overspeed reached about 3300 r.p.m. at this time according to the engineer, and 3400 r.p.m. according to the captain. The time was 2004 and the aircraft was then about 127 miles west of Annette Island Airport and 121 miles south-southeast of Sitka. Power was reduced, the aircraft was slowed to 150-155 knots, and engine r.p.m. maintained at 2600 in order to minimize the overspeed condition.

During continued attempts to feather the No. 2 propeller the oil quantity dropped rapidly and the normal oil supply was depleted. Oil was then transferred from the auxiliary tank and this was similarly depleted. Subsequently the r.p.m., BMEP, fuel, and oil pressure gauge readings dropped to zero; however, the propeller continued to rotate. The captain immediately reduced power and placed the aircraft in a descent in order to be near the water in the event immediate ditching became necessary.

Meanwhile, First Officer Perry was making radio calls on the emergency frequency of 121.5 mcs. He received answers which were "cluttered," so he made MAYDAY calls four or five times to clear the emergency frequency and described the flight's predicament. He and the captain conferred on the heading to be flown and decided to head for the southern tip of Baranof Island some 70 miles distant. The first officer gave the captain the proper heading. The aircraft, still descending and still in the overcast, was turned to that heading.

The first officer continued to monitor flight progress, using radar and other aids. He also made numerous radio calls including contact with a Pacific Northern Airlines flight, Sitka radio, and the U. S. Coast Guard.

At an altitude of about 6,000 feet the water surface first became visible. At 4,000 feet good visual contact was established with the water. Descent continued until the aircraft was about 500 feet above the surface. The flight passed the southern tip of Baranof Island and continued toward Biorka Island, in Sitka Sound, at that altitude.

Many radio contacts were made by the first officer to determine weather conditions at the nearest airport or suitable landfall which the aircraft might reach while maintaining the low altitude required for the anticipated imminent ditching.

Upon nearing Biorka Island the captain remarked to the first officer that the nose section of No. 2 engine was cherry red and throwing off metal particles. Other crew members also observed this condition. The captain immediately ditched the aircraft on a heading of 300-330 degrees and at a speed of about 95 knots. The first officer had fully extended the wing flaps and turned off all electrical power when the aircraft was 15 or 20 feet above the water. The time of ditching was 2052.

Initial water contact was smooth and was quickly followed by two impacts, the first light, the second heavier. The aircraft quickly slowed to a stop and floated high in a smooth sea with no visible damage other than bent propeller blades.

The 2000 weather observation by the Coast Guard Cutter Sorrel, standing by at the ditching site, showed in part an overcast of nimbostratus and stratus, visibility less than 7 miles, wind calm, temperature 47°F. The 2200 Sorrel observation showed a stratocumulus overcast, visibility less than 20 miles, wind calm, temperature 53°F, sea water surface temperature 56°F, moderate swell from the west, calm or slight sea. The aircraft sank in an estimated 24 minutes in water 250 feet deep at position 56°52'48"N, 135°20'20"W.

## Preparations for Ditching

Detailed preparations were started when the captain told the steward to prepare for ditching and continued until the actual ditching, about 45 minutes later. Recognizing that No. 2 propeller might separate from the engine and penetrate that area, the steward and both stewardesses had 28 passengers move out of the first five rows of seats on the right and the first six rows on the left. These persons were seated in unoccupied seats or on the floor between seats, off the aisle and facing sideways. The seven children aboard were fitted with children's lifevests and distributed strategically, for optimum assistance in leaving the aircraft. All other passengers, as well as the three cabin attendants, wore lifevests. Backs of seats were raised. The passengers were instructed to remove all sharp objects from their persons. These, along with loose objects such as food trays and other galley equipment, arm rests which had been removed from the seats, carry-on baggage, etc., were stowed out of the way so as not to impede evacuation. Passengers were rehearsed in folding their arms and bowing their heads into or toward pillows, blankets or coats in their laps, and told to do this upon signal, just prior to touchdown. Passengers seated near emergency exits were instructed in the method of opening the exits and launching liferafts. Further, the passengers were cautioned not to take such emergency action until advised.

The aircraft carried five 20-man liferafts in the cabin and one 10-man liferaft on the flight deck. Four of the 20-man liferafts were placed for expeditious use and their static lines secured to nearby seats. One was placed at each of the two aft overwing exits, one at the main cabin door, and one at the aft right emergency exit door. The fifth 20-man raft was berth-stowed overhead opposite the galley. The steward again went to the flight deck and informed the crew that the cabin was "fairly well secured." He returned to the cabin and made final checks on the preparations. Check Pilot Kellogg entered the cabin from the flight deck and was followed by Flight Engineer Hackett, as the aircraft started down. The steward used the cabin public address system to tell passengers to assume proper ditching positions and to remain that way until told to get up.

## Evacuation

The captain and the first officer, who were alone in the cockpit, launched the 10-man liferaft through the right-hand cockpit window when the aircraft came to rest. Before the captain left he looked in the cabin and saw that everyone had gotten out except one stewardess, who was just then leaving.

When the airplane struck the water the resulting decelerative forces caused the berth-stowed 20-man liferaft and food trays to become dislodged and fall. However, these forces did not cause personal injuries to the aircraft occupants. A few minor injuries were incurred during the actual evacuation.

The check pilot, who had previously gone to the cabin, had taken a seat opposite the main cabin door. He helped launch two liferafts through this door, one of which had been placed there and the other which had fallen from where it had been berth-stowed overhead opposite the galley. He assisted people into them and then boarded the second of the two.

The flight engineer, who also had gone to the cabin, did not have time to take a seat and remained crouched and braced against the galley during the ditching. He assisted in launching the first raft from the main cabin door, helped people into it, and boarded it himself.

The steward and both stewardesses directed and helped cabin occupants to launch the other three 20-man rafts. People who went out through overwing exits stood briefly on the wing before transferring to liferafts. Others evacuated the airplane through the floor level emergency exit door at the aft right side of the cabin. Only a few persons were immersed.

Water depth in the cabin was reported as reaching "knee deep" or "two feet deep." Difficulties during evacuation included a partial and brief cluttering or blocking of exits by people, debris, and ropes attached to rafts. Passengers and crew members reported four instances of being unable to find the knife carried on rafts to cut the static line. Pocket knives were quickly used and tossed from one raft to another.

By 2057, five minutes after ditching, all occupants were in six rafts; only one raft did not have a crew member in command. There were two people, captain and first officer, in the 10-man raft, and 29, 28, 18, 15 and 10 persons, respectively, in the five 20-man rafts. Within another 20 minutes all had been transferred to the FAA launch Fedair I which was standing by with radioed knowledge of the impending ditching. All occupants were then re-transferred to the Coast Guard Cutter Sorrel and taken to Sitka. The Sorrel docked there at 2310 and occupants were immediately admitted to the Mt. Edgecumbe Hospital for observation. There were no apparent serious injuries.

Because the failed No. 2 powerplant was not recovered, investigation centered on examination of maintenance records and the observed behavior of this powerplant during the emergency. A detailed review of all such records, of the aircraft and of all four powerplants, showed compliance with FAA requirements as well as with company procedures. No. 2 powerplant and all its components had been operated less than the prescribed limits since overhaul. However, this was the first airborne use of high blower since overhaul. No other significant item appears in the maintenance or operational records of this powerplant.

### Analysis

The successful ditching at sea of the DC-7 and the evacuation of all 95 passengers and 7 crew members without injury is, under any circumstances, an outstanding feat. In addition to the skill of the pilots, the efficiency of the ditching is attributable to several factors. These were virtually ideal conditions of wind and sea, crew familiarity with ditching procedures, ample time (some 45 minutes) to make ready both the flotation equipment and the passengers, and finally, the military passengers' receptiveness and responsiveness to orders.

Although no serious consequences resulted, there were two matters during the preparation for ditching and evacuation which warrant mention in this report. One, Northwest Airlines provided distinctively colored life jackets for the crew members to make them readily recognizable by passengers. However, the passengers were not advised of this distinction. The other was difficulty experienced in obtaining knives to cut the lanyards tying the rafts to the sinking airplane. Although these lanyards are designed to break as the airplane sinks, knives are provided in pockets on the raft. In this instance it was necessary for passengers to use their personal knives.

Investigation disclosed that emergency radio communications between the aircraft, other aircraft, FAA ground stations, and the Coast Guard had been

handled expeditiously and cooperatively. Investigation also disclosed that adequate flotation gear, both lifevests and liferafts, was available.

At the time of the initial trouble the nearest airport with a suitable runway was Annette Island Airport, some 127 miles distant on a direct easterly course. To proceed to Annette Island Airport the flight would have been required to maintain a minimum altitude of 4,000 feet in order to clear 3,500-foot mountains on Prince of Wales Island which was on the direct course. Even if it had been possible to maintain this altitude with the reduced power and the propeller windmilling, the flight would have had to proceed for a short period of time over mountainous terrain which would have precluded a successful emergency landing if such became necessary. To descend to the 500-foot altitude desired by the pilot in order to provide for expeditious ditching would have required a circuitous route south of Prince of Wales Island, thus increasing the distance by some 40 miles. This course would also have required that the descent to visual flight conditions be made back through some of the icing conditions that the flight had attempted to avoid. The crew did learn that the weather at Sitka, 121 miles distant when trouble started, was good, and proceeded there despite Sitka not having an airport, but merely seaplane facilities. Gustavus Airport, some 95 miles beyond Sitka, had good weather and it was the captain's intent to continue there if possible. This was precluded by the rapid deterioration of No. 2 powerplant with attendant fire and structural hazard.

The crew initially diagnosed the large power loss as resulting from carburetor ice, and carried out the ice elimination procedures. The aircraft had been experiencing induction icing for some two hours and the airframe was also carrying considerable ice at the time of the engine trouble, so it was logical for the crew to assume that the initial power loss was caused by induction icing. The crew estimated that the period of time from the initial power loss to the overspeed was approximately 30 to 60 seconds.

The sequence of events of the malfunctioning of the No. 2 powerplant assembly indicated that a failure occurred to components in the two-speed supercharger drive assembly. Failures in this assembly result in sudden and large losses of power as most of the supercharging effect in the engine is lost. Associated with this type of failure, the BMEP and manifold pressure drop suddenly, with the manifold pressure indications returning to ambient pressure; however, the BMEP will continue to drop to the low limit of the indicator, as happened in this instance. If the propeller is not feathered immediately, numerous metal particles are quickly circulated with the oil through the engine, damaging many bearings, bushings and other parts.

A failure of this type dictates fast and accurate diagnosis and immediate feathering of the propeller. However, the previous indications of induction icing made it unlikely that the crew would initially suspect failure in the supercharger section since, due to the similarity of these symptoms, the initial indications of such a failure would also indicate that the engine was experiencing induction icing.

The failure in the No. 2 engine started with the loss of BMEP from 172 to 80 and finally to 50, the limit of the indicator. This indicates that the drives in the supercharger gear train were becoming disengaged, probably due to failure of bushings and/or gears. Metal particles generated by these failures would

cause failures of the accessory drives and their bushings and they would cease to operate. This is substantiated by cockpit indications of the loss of manifold pressure, fuel pressure, and oil pressure. Furthermore, the ignition analyzer showed no firing by the magneto. The contamination by the initial failure would cause failure of the master rod bearings and reciprocating assemblies. The contamination would also interfere with normal propeller governor action and the propeller would begin to overspeed.

The loss of all normal and emergency oil can also be related to the initial failure in the supercharger drive assembly. The metal contamination would result in failure of the oil pump drives and bushings and the oil would not be returned to the oil tank. Further, the propeller oil transfer bearing in the nose case would similarly begin to fail and the oil being supplied by the auxiliary pump would accumulate in the engine and thus not be available to feather the propeller.

Inability to feather the overspeeding propeller resulted from metal particles in the propeller governor and its by-pass valve as well as a possible failure of the oil transfer bearing and seals. This prevented the routing of the high pressure feathering oil to the propeller pitch changing mechanism.

The propeller assembly installed on the aircraft was equipped with an r.p.m. sensitive pitch lock mechanism which prevents a propeller from uncontrolled overspeeding. It is evident that the pitch lock did prevent a severe overspeed and the likelihood of catastrophic damage to the aircraft.

Probable Cause

The Board determines that the probable cause of the accident was an uncontrollable overspeeding propeller due to failure in the blower section of No. 2 engine.

BY THE CIVIL AERONAUTICS BOARD:

/s/ ALAN S. BOYD  
Chairman

/s/ ROBERT T. MURPHY  
Vice Chairman

/s/ CHAN GURNEY  
Member

/s/ G. JOSEPH MINETTI  
Member

/s/ WHITNEY GILLILLAND  
Member

## S U P P L E M E N T A L   D A T A

### Investigation

The Civil Aeronautics Board was notified of the accident at the time of occurrence. An investigation was immediately initiated in accordance with the provisions of Title VII of the Federal Aviation Act of 1958.

### The Carrier

Northwest Airlines, Inc., is a Minnesota corporation with its principal office in Minneapolis, Minnesota. The corporation holds a certificate of public convenience and necessity issued by the Civil Aeronautics Board and an air carrier operating certificate issued by the Federal Aviation Agency. These certificates authorize the carrier to engage in air transportation of persons, cargo and mail over the route involved.

### The Aircraft

The aircraft was a Douglas Model DC-7C, serial No. 45204, and carried FAA identification N 285. It was manufactured April 5, 1957, and at the time of the accident had a total operational time of 17,175:30 hours. Maintenance had been current and in compliance with FAA requirements.

The four engines were Wright R-3350 model 988TCL8EA4 and the propellers were Hamilton Standard model 34E60-355-P7. Maintenance of powerplants and components had been current and in compliance with FAA requirements. The No. 2 engine and its propeller had operated 202 hours since overhaul.

### Flight Personnel

Captain Vinton R. Hanson, age 48, had a total of 15,772 hours of piloting time, of which 1,579 had been in DC-7s. He was properly certificated, rated, and checked for the subject flight. His rest period, prior to the start of the flight, was in excess of 24 hours. Captain Hanson had received his last company training in ditching June 22, 1962.

First Officer Earl C. Perry, age 37, had a total of 12,579 hours of piloting time, of which 1,925 had been in DC-7s. He was properly certificated, rated, and checked for the subject flight. His rest period, prior to the start of this flight, had been in excess of 24 hours.

Flight Engineer Donald E. Hackett, age 48, held a Flight Engineer Certificate. He had flown a total of 11,590 hours, of which 3,126 had been in DC-7s. His periodic and equipment checks were current and he had rested for 24 or more hours prior to the start of this flight.

Captain (Check Pilot) Francis H. Kellogg, age 44, had a total piloting time of 13,374 hours, of which 948 had been in DC-7s. He was also properly certificated, rated, and checked for this flight. His rest period, prior to departure, had exceeded 24 hours.

All three cabin attendants, Mr. Richard D. Chinmook and Misses Kathryn E. Ollinger and Ruth E. Fullerton were properly qualified for their duties.