CFIT, World Airways, Inc., DC-8-63F, N802WA, King Cove, Alaska, September 8, 1973

Micro-summary: **This DC-8-63F flew into mountainous terrain.**

Event Date: **1973-09-08 at 0542 ADT**

Investigative Body: **National Transportation Safety Board (NTSB), USA**

Investigative Body's Web Site: **http://www.ntsb.gov/**

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File No. 1-0018

AIRCRAFT ACCIDENT REPORT

WORLD AIRWAYS, INC.
DC-8-63F, N802WA
KING COVE, ALASKA
SEPTEMBER 8, 1973

Adopted: May 8, 1974

NATIONAL TRANSPORTATION SAFETY BOARD
Washington, D.C. 20591
Report Number: NTSB-AAR-74-6

File No. 1-0018

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AIRCRAFT ACCIDENT REPORT

Adopted: May 8, 1974

WORLD AIRWAYS, INC.
DC-8-63F, N802WA
KING COVE, ALASKA
SEPTEMBER 8, 1973

SYNOPSIS

About 0542 Alaska daylight time on September 8, 1973, World Airways, Inc., Flight 802, a DC-8-63F, (N802WA), crashed into Mt. Dutton, near King Cove, Alaska. The six occupants--three crewmembers and three non-revenue company employees--were killed. The aircraft was destroyed by impact and fire.

Flight 802 was a Military Airlift Command contract cargo flight from Travis AFB, California, to Clark AFB, Philippine Republic, with intermediate stops at Cold Bay, Alaska, and Yokota AFB, Japan. It was cleared for approach 125 miles east of the Cold Bay Airport. The last recorded transmission from the flight to the Cold Bay flight service station was that it was leaving 31,000 feet. The aircraft crashed at the 3,500-foot level of Mt. Dutton, about 15.5 miles east of the airport.

The National Transportation Safety Board determines that the probable cause of the accident was the captain's deviation from approved instrument approach procedures. As a result of the deviation, the flight descended into an area of unreliable navigation signals and obstructing terrain. As a result of this accident, the Safety Board has made recommendations to the Federal Aviation Administration.

1. INVESTIGATION

1.1 History of the Flight

World Airways, Inc., Flight 802, a DC-8-63F, (N802WA) was a Military Airlift Command contract cargo flight from Travis Air Force Base (AFB), California, to Clark AFB, Philippine Republic, with intermediate stops at Cold Bay, Alaska, and Yokota AFB, Japan. The crew reported to the World Airways dispatch office at Oakland International Airport, Oakland, California, at 2200 1/. From there, they went by car to Travis AFB where they were briefed by U. S. Air Force weather personnel. The crew filed the following instrument flight rules (IFR) flight plan:

1/ All times listed are Alaska daylight time, based on the 24-hour clock.

"William 1 Standard Instrument Department (SID), direct Ukiah, California, control 1486 to gateway Redwood, direct 43°N-130°W, 48°N-130°W, direct 53°N-150°W, direct 55°N-160°W, direct Cold Bay, at flight level (FL) 310, true airspeed 480 knots, and estimated time en route 4 hours 38 minutes."

The proposed alternate airport, Anchorage, was later changed to King Salmon, Alaska. The flight was cleared as filed, except for a change in SID.

Flight 802 departed Travis AFB at 0111 and proceeded to the vicinity of its last en route fix, 55° N, 160° W, without incident. At that fix, the crew was unable to contact the Anchorage Air Route Traffic Control Center (ARTCC) and finally gave their position report to the Cold Bay Flight Service Station (FSS) at 0525. The distance from Cold Bay was reported to be 125 distance measuring equipment (DME) miles, with an estimated time of arrival of 0542. The Cold Bay FSS advised that the weather was ". . . measured ceiling five hundred overcast, visibility seven, with some very light drizzle . . . winds are three zero zero degrees at two four with peak gusts at three one . . . the ceilings are ragged and it's been holding pretty much that way all evening . . . ."

At 0527 Flight 802 was cleared for an approach to the Cold Bay Airport. Both transmissions were acknowledged. At 0529, the flight reported it was leaving 31,000 feet (FL 310). This was the last recorded transmission from Flight 802. According to flight data recorder (FDR) information, the flight descended continuously and leveled off at 3,500 feet 2/. (See Appendix D.)

Although Flight 802 was not cleared for a specific approach to Cold Bay, the only approved approach procedure, in view of the weather and operating limitations, was to use the localizer back course DME approach to runway 32. Two transitions are published for this approach: (1) Proceed outbound on the localizer back course at 7,000 feet to the 19.5-mile DME fix, descend in a procedure turn to 3,500 feet on the west side of the localizer, and return to the 19.5-mile DME fix. (2) Intercept the 40-mile DME fix on the back course of the localizer and descend to 3,500 feet inbound on the localizer before the aircraft reaches the 19.5-mile DME fix. (See Appendix F.)

According to the cockpit voice recorder (CVR) transcript, a few minutes after the flight started to descend and during a discussion about the anticipated wind and approach speed, the captain said, "thirty-five hundred feet m.s.l.". (See Appendix E.) The crew subsequently completed the in-range checklist, discussed the minimum descent altitude (MDA), and began tuning the navigation receivers. There was no mention of the specific instrument approach intended.

2/ All altitudes and elevations are mean sea level.

At 0536, when the flight was about 35 nmi east of the Cold Bay VORTAC 3/ and near the 3,500-foot level, the captain asked the first officer, "Where's your DME?" The first officer replied, "Not Good." In response to the captain's remark, "No DME, huh?" the first officer said, "I got thirty seven, we were forty out the last I saw." When the first officer asked the captain whether he was going to make a procedure turn, the captain replied, "No I . . . I wasn't going to." During the next minute, the captain stated four times that without DME it would be impossible to make the approach; he added that the weather was too low for a circling approach. The captain did not explain what type of approach he intended to execute. When he was asked about the kind of terrain they were flying over, the captain said, "Mountains everywhere." At 0539, in response to the first officer's question "We should be a little higher than that out here, shouldn't we?" the captain said, "no, forty DME, you're all right."

At 0540, the captain said, "I'll go up a little bit higher here . . . no reason to stay down that low so long." However, after climbing to 4,000 feet momentarily, he again descended. A few seconds after the first officer reported, "I got twenty-four," the aircraft's heading was changed to 215°. This southwesterly heading was maintained for 30 seconds. During the remaining 70 seconds of the flight, the aircraft's heading was changed from 215° to 275°.

After his 24 DME callout, the first officer reported twice that the radio altimeter was "alive". About 22 seconds before impact, he reported "Twenty miles," and the captain responded, "Okay, what's the inbound? One forty-one." The first officer then stated, "Radio altimeters . . . hey John, we're off course . . . ." Four seconds later, power was increased, and the first officer said, "Four hundred feet from something." Six seconds later, at 0542, the aircraft struck rising terrain, at 3,500 feet, on the 087° radial, and 18 nmi east of the Cold Bay VORTAC.

1.2 Injuries to Persons

Injuries	Crew	Passengers	Others
Fatal	3	0	3
Nonfatal	0	0	0
None	0	0	

1.3 Damage to Aircraft

The aircraft was destroyed.

3/ Collocated very high frequency omnirange station and ultra-high frequency tactical air navigation aid.

1.4 Other Damage

None

1.5 Crew Information

The flight crewmembers were qualified for the flight. (See Appendix B.)

Company records indicate that the captain flew into Cold Bay 20 times during the previous 9 years. No evidence was found that he had ever flown the localizer back course approach to runway 32.

1.6 Aircraft Information

The aircraft was properly certificated and maintained according to current regulations. (See Appendix C.)

1.7 Meteorological Information

The weather in the Cold Bay area consisted of low overcast clouds and strong, gusty, surface winds. The surface weather observations preceding and following the accident were as follows:

0455 - Measured ceiling-500 feet, overcast, visibility-7 miles, very light drizzle, temperature-46° F., dew point-45° F., wind-300° at 24 knots, gusts to 31 knots, altimeter setting-29.53 inches, 10/10 of stratus clouds, ceiling ragged.

0555 - Measured ceiling-500 feet, overcast, visibility-7 miles, temperature-45° F., dew point-45° F., wind-300° at 25 knots, gusts 33 knots, altimeter setting-29.56 inches, 10/10 of stratus clouds, ceiling ragged, drizzle ended at 0530.

The aviation terminal forecast, which was issued by the National Weather Service at 1955 on September 7, was included in the weather briefing given to the crew at Travis AFB.

Part of the Cold Bay 0315 winds aloft observation follows:

Heights (Feet)	Direction (true)	Velocity (Knots)
1,000	320°	30
3,000	330	32
6,000	335	30
9,000	340	34
12,000	345	33
16,000	360	24
20,000	335	18
25,000	345	23
30,000	340	41

1.8 Aids to Navigation

The Cold Bay airport is served by a VORTAC, about 4.5 miles northwest of the airport; a low frequency radio range station, about 3 miles northwest of the airport; and an instrument landing system (ILS) for runway 14/32. After the accident, navigational facilities at Cold Bay were ground-and flight-checked; they operated satisfactorily.

Following completion of either of the two published transitions for the localizer back course DME approach to runway 32, descent below 3,500 feet is not authorized until the aircraft has passed the 19.5-mile DME fix, as follows:

Minimum altitude authorized (feet)	DME fix (miles)
1,900	9.5
1,160	7.5

After the 7.5-mile DME fix is passed, descent to the MDA of 400 feet is authorized. The 4.6-mile DME fix is the missed approach point. The published minima for the DC-8-63F are 400 feet and 1 mile visibility.

The localizer back course DME approach to runway 32 is authorized only for aircraft equipped for simultaneous reception of VOR, DME, and ILS. The localizer and DME are not collocated. This approach procedure was approved on March 11, 1971.

The U. S. Flight Information Publication, Alaskan Supplement, classifies the Cold Bay VORTAC as unusable beyond 40 miles in the following areas:

Sector	Below altitude (feet)
040° - 060°	10,000
060° - 090°	9,000
090° - 110°	8,000
110° - 160°	5,500
160° - 180°	14,000
280° - 290°	4,000

The approach chart for the localizer back course DME approach to runway 32 listed the following minimum sector altitudes (MSA):

Sector	Feet
360° - 090°	6,000
090° - 270°	6,800
270° - 360°	2,800

MSA is the minimum altitude which provides at least 1,000 feet of obstacle clearance for emergency use within 25 nmi of the facility, clockwise between the stated magnetic bearings. The bearings that define sectors are outbound.

1.9 Communications

The crew could not establish radio communication with the Anchorage ARTCC. There were no other communication difficulties.

1.10 Aerodrome and Ground Facilities

The Cold Bay Airport is located on the western shore of Cold Bay at an elevation of 98 feet. There are four large mountains within 30 miles. Frosty Peak, 5,784 feet, is about 8 miles south-southwest. Aghileen Pinnacles, 4,800 feet, and Pavlof Volcano, 8,215 feet, are about 23 and 31 miles, respectively, northeast. Mt. Dutton, 4,961 feet, 4/ is about 16 miles east. Other mountainous terrain and islands with elevations above 2,000 feet encircle most of Cold Bay. Low marshland and open sea lie to the north and west.

Runway 14/32, the instrument runway, is 10,128 feet long and 150 feet wide, with an asphalt surface. The west end of runway 8/26 intersects the south end of runway 14/32. Runway 8/26 is 5,126 feet long and 150 feet wide. Both runways have high intensity runway lights. Runway 32 has runway end identifier lights and a visual approach slope-indicator light system.

1.11 Flight Recorders

The aircraft was equipped with a Fairchild Model F-5424, serial No. 5532, Flight Data Recorder (FDR). The recorder was intact, with only minor damage to the outer case. The foil recording medium was not damaged, but the magnetic heading trace was recorded at 180° out of phase; this condition had existed at least since the aircraft's last takeoff.

The aircraft was also equipped with a Fairchild Model A-100, serial No. 3028, Cockpit Voice Recorder (CVR). Although the recorder was damaged mechanically, the tape was not damaged. A transcript of the pertinent portions of the last 18 minutes 23 seconds is contained in Appendix E. A correlation of the FDR and CVR records is contained in Appendix D.

1.12 Wreckage

The aircraft crashed into a snowfield on the east slope of Mt. Dutton, at the 3,500-foot level. The initial impact left five distinct impres-

4/ This is the elevation shown on aeronautical charts. Other charts show an elevation of 4,834 feet. (See Appendix D.)

sions in the snow, which were shaped by the fuselage and the four engines and alined on a heading of about 275°. The wreckage was scattered over an area about 1,300 feet long and 300 feet wide. Parts of all major sections of aircraft structure and flight control surfaces were found in the wreckage area.

The breakup of the aircraft's wings, fuselage, and engines was extensive. Portions of the center and aft fuselage and wing root areas were consumed by ground fire.

The landing gear was retracted, and the flaps were extended approximately 30°.

The No. 1 navigation receiver (VOR) was tuned to the Cold Bay localizer frequency (110.3 MHz), and the No. 2 VOR was tuned to the Cold Bay VOR (112.60 MHz). Both needles on the Nos. 1 and 2 radio magnetic indicators (RMI) were selected to display VOR information. The needles on the captain's RMI rotated freely; the first officer's No. 1 and No. 2 RMI needles were locked in positions of approximately 120° and 10°, respectively, clockwise from the top of the instrument. Examination of the internal mechanism of the RMI's indicated that they were displaying the following information:

	Heading	No. 1 Needle	No. 2 Needle
Captain's RMI	273° 20'	303° 20'	287° 20'
First Officer's RMI	275° 10'	44° 25'	285° 40'

The pictorial deviation indicators (PDI) and the independent distance measuring equipment (DME) indicators were examined at the facilities of the respective manufacturers. The following was found:

	Heading	Distance (Miles)
Captain's PDI	270°	934
First Officer's PDI	277°	22-33
Captain's DME	Not Applicable	29.5
First Officer's DME	Not Applicable	155

The captain's navigation receiver was damaged mechanically, but measurements within the mechanism indicated a bearing of 25°. This would represent the "parked position" associated with selection of a localizer frequency when the compass heading is 295°. The first officer's navigation receiver was also damaged; however, measurements indicated a 293.5° bearing to the VOR station selected.

The captain's Doppler control box function switch was in the manual position, and the offset indicated was 5 miles, left. Course A was selected and set at 259°. The "miles-to-go" indication was 17.5 miles.

1.13 Medical and Pathological Information

The pathologist determined that the deaths of the six persons were caused by impact. Thermal injuries occurred post mortem.

1.14 Fire

A severe ground fire penetrated the fuselage in the wing root area and consumed large portions of the structure. Smaller isolated ground fires damaged the aft fuselage, the separated wing sections, and the engines. The crash site was not accessible to firefighting equipment.

1.15 Survival Aspects

This accident was not survivable.

1.16 Tests and Research

Not applicable.

1.17 Other Information

Recently, the Safety Board received details of an incident which involved a DC-8-63F aircraft during an approach to the Cold Bay Airport on October 3, 1973. According to the crewmember who reported this incident, the flight was making a "back door" approach to runway 32. None of the crewmembers were experienced with this approach. At 25 DME, while that aircraft was approaching the Cold Bay VOR from the east, and at an altitude of about 4,000 feet, the "DME began searching and became erratic." This crewmember called the erratic behavior of the DME to the attention of the captain. As the flight broke out of the overcast, the crew noticed mountains immediately to the left and right of the flightpath; the altitude was 3,500 feet, and the DME showed "around 22 as it came in strong at the time." The flight completed a visual approach to the runway. During a discussion after the incident, the crew concluded that their examination of the approach chart before the approach had produced a "mental picture" that the approach to the 20-mile DME point would be over water. The reporting crewmember stated, "Close scrutiny of the off-route sector altitudes showed us that our approach should have been minimum sector altitude until established on the approach leg and 40 DME."

2. ANALYSIS AND CONCLUSION

2.1 Analysis

The flightcrew was qualified, and the aircraft was maintained according to FAA and company procedures. There were no malfunctions of the aircraft systems or powerplants. All ground navigational facilities operated within tolerances.

The flight proceeded routinely until about 0525, when the crew called the Cold Bay FSS and reported that they were unable to contact Anchorage ARTCC. They were 125 miles from Cold Bay at FL 310. Shortly thereafter, they were given the current Cold Bay weather and were cleared for an approach to the Cold Bay airport. Although there was no specific reference to the type of approach the crew intended to make, conversation between the captain and the first officer indicated that both were anticipating a back course approach to runway 32. Because of the wind condition, it was necessary to use runway 32; the ceiling precluded a circling approach. However, because the aircraft descended through 5,000 feet before the first officer reported that his DME was "not good", it must not have been the intent of the captain, who was flying the aircraft, to use the transition that required flying outbound on the localizer back course at 7,000 feet to prepare for the back course approach to runway 32. This conclusion is supported by the captain's response when the first officer asked him whether he was going to make a procedure turn, and the captain said, "No, I wasn't going to."

The captain's only authorized alternative was to intercept the 40-mile DME fix on the back course of the localizer and descend, inbound, to 3,500 feet before he reached the 19.5-mile DME fix. There is no indication, however, that the captain planned to adhere precisely to this procedure. He maintained a westerly heading toward the VORTAC until the aircraft was about 25 DME-miles from the VORTAC, despite his remarks indicating that he realized he was within the 40-mile range. The first significant heading change, which indicated an attempt to intercept the back course of the localizer, was not made until shortly after the first officer reported a 24-mile DME reading. For the sake of expediency, the captain probably intended to position the aircraft inbound on the back course of the localizer, between the 40-mile and the 19.5-mile DME fixes. If he had maintained the southwesterly heading, which he initiated about 2 minutes before impact, until he received reliable indications that the aircraft was about 30° from the localizer centerline, he would have avoided a collision with the mountain. Actually, he maintained the southwesterly heading for only 30 seconds before he made a right turn to a westerly heading. Therefore, the captain must have received indications that led him to believe that he was southeast of the VORTAC instead of east-southeast of it.

As a result of the en route descent to 3,500 feet, the flight operated for about 6 minutes before the crash in an area where high terrain would have affected the reliability of the VORTAC signals. Theoretically, descent below the line of sight to the VORTAC should reduce signal strength to a point at which warning flags should appear. However, the CVR does not indicate that the warning flags appeared. Although the aircraft had descended into the area where the VORTAC was unusable, the reflected signal strength, apparently, was sufficient to keep the VOR warning flags biased from view. According to CVR

data, the only indication that the crew noticed an irregularity was the first officer's remark that his DME was "not good". That remark coincided with the aircraft's descent through 4,500 feet and may have been prompted by intermittent operation of the first officer's DME such as that described by the crew involved in the approach incident near Cold Bay. The crew of Flight 802 were apparently unaware of the terrain-related restrictions of the navigation signals and made no attempt to climb higher for better signal reception. Despite his monologue about the problems associated with loss of the DME, the captain apparently kept relying on the readings he received. Actually, the DME callouts by the first officer of 37, 35, 29, 24 and 20 miles were all accurate.

The probability that the flight's right turn to a westerly heading, about 20 seconds before impact, was based on erroneous azimuth information is supported by the reading obtained from the first officer's navigation receiver, which was tuned to the Cold Bay VORTAC. The bearing mechanism of the recovered receiver, indicated a 293.5° magnetic bearing to the VORTAC. The bearing from the crash site to the VORTAC, however, was 267°. At impact, the first officer's navigation receiver controlled the indications of the No. 2 needles of both RMI instruments. The internal mechanism of the captain's RMI showed a 287° bearing to the VORTAC; the first officer's, a 285° bearing. If the effects of impact are considered, the readings on these instruments apparently corresponded closer to the 293.5° input from the first officer's navigation receiver than to the 267° bearing of the crash location. Therefore, the Safety Board concludes that the aircraft's low altitude, in conjunction with the intervening mountainous terrain, resulted in the display of erroneous azimuth information, which led the captain to believe that he was southeast of the VORTAC and approaching the ILS back course.

Although the captain had flown into Cold Bay 20 times over a period of 9 years, this was only his second recent trip, and the first time he had attempted to fly the back course approach. Nevertheless, his overall familiarity with the terrain in the Cold Bay area was apparent from his words, "mountains everywhere," in response to one of the first officer's questions. The reason for his ignoring the information shown on the approach chart, that indicated prominent peak elevations and minimum sector altitudes, could not be found.

About 2 minutes before impact, the first officer said, "We should be a little higher than that out here, shouldn't we?" The captain's answer, "No, forty DME you're alright," implies that he believed that the minimum authorized altitude of 3,500 feet at the 40-mile DME fix also applied to the area from which he was approaching the localizer. To subsequent callouts from the first officer that the radio altimeter was "alive" the captain responded, "Okay", without indication of alarm.

Twenty-two seconds before impact, the first officer reported, "Twenty miles", and the captain responded, "Okay, what's the inbound? One forty-

one". This response and the right turn initiated simultaneously suggest that the captain intended to intercept the back course near, or inside, the 19.5-mile DME fix. Twelve seconds before impact, the first officer said, "Radio altimeters... hey John, we're off course". The subsequent sound of increased engine power coincided with the first officer's final remark: "Four hundred feet from something". The aircraft's altitude trace showed that a pullup maneuver was started a few seconds before impact.

In summary, the intentional descent to 3,500 feet placed the aircraft not only in an area of unreliable VORTAC signals, but also below the published minimum sector altitude. Although the readings of the navigational instruments in the area of VORTAC unreliability, and their interpretation by the crew, are subject to conjecture, evidence shows that the captain intended to intercept the ILS back course within the 40-mile range from the VORTAC, which was contrary to approved approach procedures.

Since the captain would not knowingly risk colliding with high terrain, he obviously did not familiarize himself with the essential information displayed on the approach chart. He may have acquired a false sense of security by focusing his intention on the 3,500-foot minimum authorized altitude associated with the 40-mile DME fix on the back course of the localizer. Had the captain indicated what type of approach he intended to make, the first officer would have been in a better position to project the planned approach path on the approach chart and question the soundness of the captain's plan.

2.2 Conclusions

a. Findings

1. The aircraft was properly certificated, and there was no known malfunction of the aircraft or its components.

2. The crewmembers were properly certificated and qualified.

3. Air traffic control handling was routine.

4. The weather forecast was accurate.

5. All aids to navigation at Cold Bay were operating properly.

6. The only approach procedure that was authorized under the weather conditions was the localizer back course DME approach to runway 32.

7. The captain did not comply with the approved instrument approach procedures.

8. The captain was apparently not aware of the minimum sector altitudes, the published restrictions on the use of the Cold Bay VORTAC, or the specific location of Mt. Dutton.

b. Probable Cause

The National Transportation Safety Board determines that the probable cause of the accident was the captain's deviation from approved instrument approach procedures. As a result of the deviation, the flight descended into an area of unreliable navigation signals and obstructing terrain.

3. RECOMMENDATIONS

As a result of this accident, the Safety Board on May 24, 1974, submitted recommendation A-74-53 to the Administrator of the FAA. A copy of the recommendation letter is included in Appendix G.

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ JOHN H. REED
Chairman

/s/ FRANCIS H. McADAMS
Member

/s/ LOUIS M. THAYER
Member

/s/ ISABEL A. BURGESS
Member

/s/ WILLIAM R. HALEY
Member

APPENDIX A

INVESTIGATION AND HEARING

1. Investigation

The Safety Board was notified of the accident at 0750 on September 8, 1973, by the Federal Aviation Administration. An investigation team was sent to the scene of the accident. Working groups were established for operations, air traffic control, weather, human factors, maintenance records, structures, systems, powerplants, cockpit voice recorder, and flight data recorder. Interested parties included the Federal Aviation Administration, World Airways, Inc., International Brotherhood of Teamsters, and McDonnell Douglas Corporation. The on-scene investigation was completed on September 17, 1973.

2. Hearing

There was no public hearing.

APPENDIX B

CREW INFORMATION

Captain John A. Weininger

Captain John A. Weininger, 52, held Airline Transport Pilot Certificate No. 462310, with ratings for airplane multiengine land, Lockheed Constellation, DC-6, DC-7, DC-8, B-707/720, and commercial privileges for airplane single-engine land and multiengine sea. He had accumulated about 22,913 flight-hours, including 1,969 hours in the DC-8. His last proficiency check was completed on July 1, 1973, and his FAA first-class medical certificate was issued April 11, 1973, with no limitations.

First Officer Gregg W. Evans

First Officer Gregg W. Evans, 27, held Airline Transport Pilot Certificate No. 1730363, with ratings for airplane multiengine land, DC-3, and commercial privileges for airplane single-engine land. He had accumulated about 4,984 flight-hours, including 457 hours in the DC-8. His last proficiency check was completed on February 8, 1973, and his FAA first-class medical certificate was issued September 4, 1973, with no limitations.

Flight Engineer Robert W. Brocklesby

Flight Engineer Robert W. Brocklesby, 46, held Flight Engineer Certificate No. 1370804, with both turbojet and reciprocating powered ratings. He had accumulated 9,830 flight-hours, including 542 hours in the DC-8. He completed his training in the DC-8 on February 19, 1973, and his FAA second-class medical certificate was issued on July 10, 1973, with no limitations.

The captain had been off duty for 53 hours before reporting for this flight. The first officer and flight engineer had been off duty for a week. All three crewmembers had 7 hours 42 minutes of duty time and 4 hours 31 minutes of flight time for the 24-hour period preceding the accident.

APPENDIX C

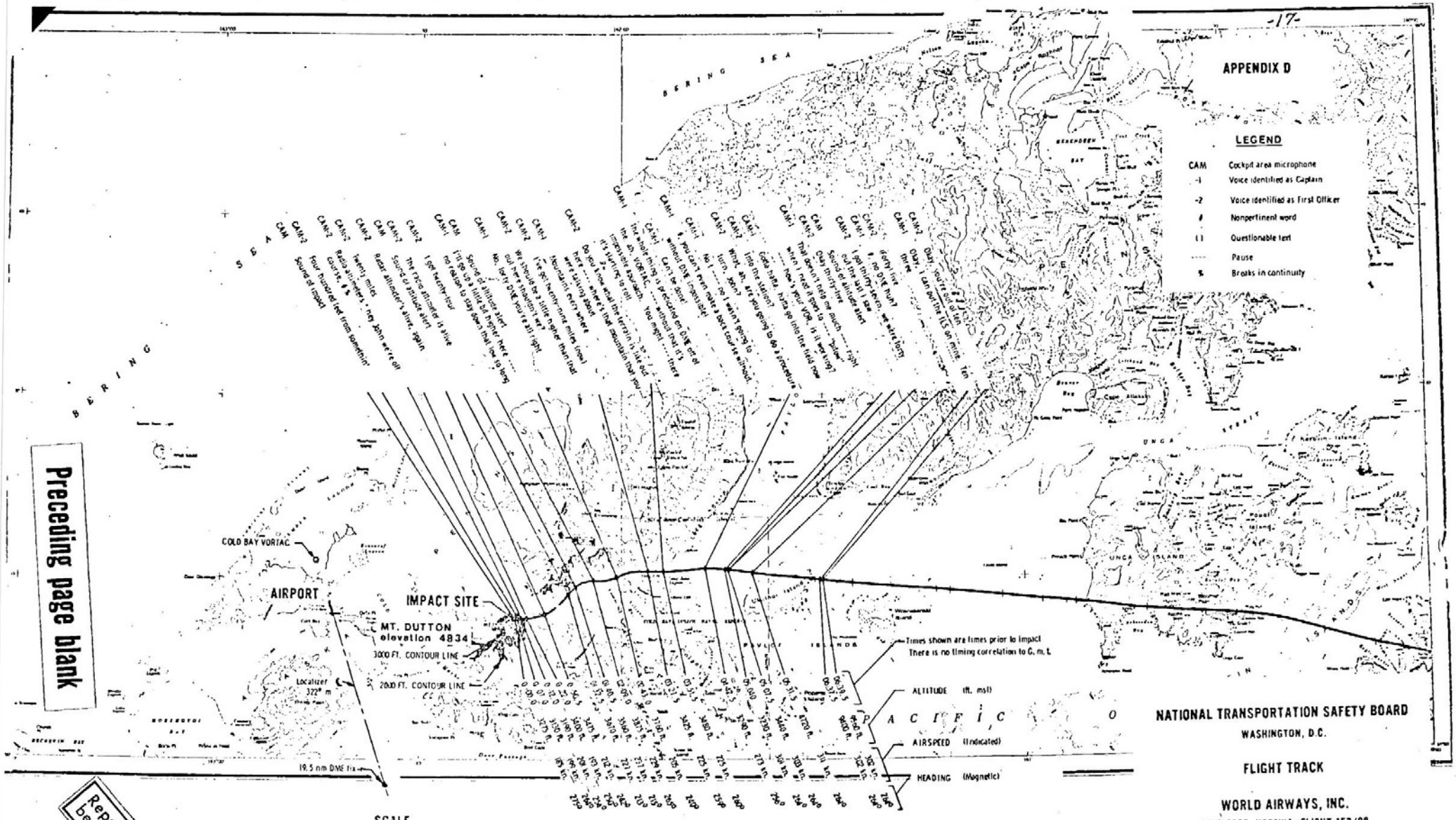
AIRCRAFT INFORMATION

N802WA, a McDonnell Douglas DC-8-63F, serial No. 46146, was purchased by World Airways, Inc., on March 12, 1971. It had been flown 10,077 hours before the accident flight. The last major inspection, phase service check 3, was accomplished on September 5 and 6, 1973. Four Pratt & Whitney JT3D-7 engines were installed as follows:

Position	Serial No.	Time Since Overhaul	Total Time
1	P671273	4,790.57	6,884.58
2	P671437	---	8,594.57
3	P671337	---	11,019.04
4	P678974	---	8,199.22

The computed takeoff gross weight was 332,992 pounds, and the center of gravity was about 26.4 percent MAC. Both were within the allowable limits. The estimated gross weight and center of gravity at the time of the crash were 262,992 pounds and 25 percent MAC, respectively.

All discrepancies listed on the aircraft maintenance log sheets from August 1, 1973, through September 7, 1973, were cleared through appropriate maintenance action. The only deferred item concerned the resupply of Doppler log sheets. The only open Airworthiness Directives required repetitive inspections of the landing gear and control column.



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Appendix E

TRANSCRIPTION OF COCKPIT VOICE RECORDER DATA, FAIRCHILD A-100, S/N 3028, WORLD AIRWAYS DOUGLAS MODEL DC-8-63CF, N802WA, FLIGHT 802 , KING COVE, ALASKA, SEPTEMBER 8, 1973

LEGEND

CAM	Cockpit area microphone
RDO	Radio transmissions from World Airways Flight 802
-1	Voice identified as Captain
-2	Voice identified as First Officer
-3	Voice identified as Second Officer
-4	Nonrevenue company personnel
-?	Voice unidentified
CB	Cold Bay Flight Service Station
*	Unintelligible word
#	Nonpertinent word
%	Breaks in continuity
( )	Questionable text
(( ))	Editorial insertion
----	Pause

Note: Times expressed in elapsed time.

TIME & SOURCE	CONTENT
00:11.0 RDO-2	Ah, Cold Bay World eight zero two, good morning one twenty-six seven
00:21.0 CB	World eight zero two, World eight zero two Cold Bay
00:48.0 RDO-2	Okay, we're unable to reach Anchorage on one eighteen five, we're now one hundred, one hundred and twenty-five DME out
01:01.0 CB	World eight zero two Cold Bay roger, understand hundred and twenty-five DME out and, ah, requesting, ah, a approach clearance?
01:49.0 RDO-2	And World eight zero two overhead Cold Bay at four two
01:59.5 CB	World eight zero two, Cold Bay roger, 'n what's your altitude?
02:03.0 RDO-2	And we're level three one zero sir
02:08.0 CB	World eight zero two Cold Bay roger, and our current weather, we're presently five hundred measured ceiling five hundred, our measured ceiling five hundred overcast, visibility seven with some very light drizzle. Temperature is four six, dew point four five, winds are three zero zero degrees at, at two four with peak gusts at three one, altimeter's two niner five three, the ceilings are ragged and it's been holding pretty much, ah, that way all evening, over
02:36.0 RDO-2	Eight zero two roger
02:37.5 CAM-1	Same thing I copied a long time ago
03:21.0 CB	ATC clears World eight zero two for an approach to the Cold Bay Airport

TIME & SOURCE	CONTENT
03:27.0 RDO-2	Okay World eight zero two, cleared for the approach
CAM-2	That's the first time I've ever been cleared for an approach like this? Whooo!
04:20.0 CAM	Sound of Cold Bay low frequency range "A" quadrant
05:07.0 RDO-2	World eight zero two descending out of three one zero
05:22.0 CAM	Sound of altitude alert
07:43.5 CAM-1	Thirty-five hundred feet m.s.l.
08:14.0 CAM-1	Want to wake everybody up and get 'em up here, please?
08:30.0 CAM-1	In range check. What was that altimeter?
CAM-2	Two nine five three
CAM-2	We're out of eighteen ((call out on in-range checklist))
09:20.5 CAM-2	Do you want the ILS now John?
CAM-1	Yeah, soon as I get in here about fifty miles, I'll put it on
09:57.5 CAM-2	MDA is four hundred isn't it?
CAM-1	Yeah
10:07.0 CAM-3	In-range complete

TIME & SOURCE	CONTENT
CAM-2	MDA four forty
CAM-1	Four hundred and forty ---- which is about a hundred foot, and be, ah, five forty indicated
CAM-1	Ahh, we're a little high, think I'll diddle around here, got a little slow getting down, kinda help to wake up the passengers
11:16.0 CAM-1	Do you want to put the heat on ---- scoops on, and a, all of them, all the way across
11:43.5 CAM-2	Okay, you're out of ten
11:45.5 CAM-1	Okay, I can put the ILS on mine. Ten three
11:50.5 CAM	Sound of Cold Bay ILS identifier begins
CAM-(2)	And three twenty-two in the window
CAM-2	Okay, your ILS identifies, d'ya hear it?
12:51.5 CAM-2	(Forty) five
CAM-1	Where's your DME?
CAM-2	Not good
CAM-1	#, no DME huh?
13:15.5 CAM-2	I got thirty-seven, we were forty out the last I saw

TIME & SOURCE	CONTENT
13:16.0 CAM	Sound of altitude alert ((at same time word "thirty" above))
13:19.0 CAM-2	Okay thirty-five
CAM-1	That doesn't help me much ---- right when I need it goes to ----"pitow" ---- how's your VOR, is it working?
CAM-1	Gotta hafta, hafta go into the field now
CAM-2	Into the station?
13:40.5 CAM-2	What, ah, are you going do a procedure turn, John?
CAM-1	No I ---- no I wasn't going to
CAM-1	#, you can't even make a back course without, without DME, impossible!
CAM-1	Can't be done!
CAM-1	The whole thing is predicated on DME off of the, ah, VORTAC, ---- without that it's impossible approach. You might ---- there it's starting to roll
CAM-1	Yeah, without DME you can't make it!
CAM-1	It's too low for a circling
14:31.5 CAM-2	Do you know what the terrain is like out here ---- where's that mountain that you were talking about
CAM-1	Mountains every where
CAM	Sound of engine power increase

TIME & SOURCE	CONTENT
CAM-1	Try the VOR on mine
CAM-2	Just a second
14:55.5 CAM-2	I've got twenty-nine miles (now)
CAM-1	Okay back to the ILS
CAM-2	We should be a little higher than that out here shouldn't we?
CAM-1	No, forty DME you're all right
CAM-2	You're all right
CAM-1	You got a for----
CAM-2	You're all right
CAM-1	You got, ah, forty reading, but then you lost the bloody thing
CAM	Sound of power increase
15:40.0 CAM	Sound of altitude alert
CAM-1	I'll go up a little bit higher here ---- no reason to stay down that low so long
CAM	Sound of power decrease
16:14.0 CAM-2	I got twenty-four
CAM-1	Okay
16:41.5 CAM-2	The radio altimeter is alive
16:42.5 CAM	Sound of altitude alert
CAM-1	Okay, good

TIME & SOURCE	CONTENT
16:50.5 CAM	Sound of altitude alert
17:20.5 CAM-1	Flaps twelve
CAM	Sound of heavy click
17:32.5 CAM-2	Radar altimeter's alive, again
CAM-1	Okay
CAM-1	Ehhh
CAM-2	Airspeed
CAM-1	Yeah
18:01.0 CAM-2	Twenty miles
18:02.0 CAM-1	Okay, what's the inbound? One forty-one
18:11.0 CAM-2	Radio altimeters * hey John we're off course, # %
18:15.0 CAM	Sound of power increase
18:16.0 CAM-2	Four hundred feet from somethin'
18:17.0 CAM-(3)	("Let's have it" or "shove it") ((appears simultaneously with word "somethin'" above))
18:22.5 CAM-1	Get back
18:23.0 CAM	Sound of impact

Illustration not Available

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NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

APPENDIX G

ISSUED: May 24, 1974

Forwarded to:

Honorable Alexander P. Butterfield
Administrator
Federal Aviation Administration
Washington, D. C. 20591

SAFETY RECOMMENDATION(S)

A-74-53

On September 8, 1973, a World Airways DC-8 was involved in an accident near King Cove, Alaska. The National Transportation Safety Board's investigation has focused attention on the instrument approach procedure (IAP) for the ILS back course (BC) DME approach to runway 32 at the Cold Bay Airport, in Cold Bay, Alaska.

Depicted on the pertinent IAP chart is a 40-mile DME initial approach fix (IAF) and a prescribed minimum altitude (MA) of 3,500 feet for inbound flights after they pass the IAF. The Safety Board is concerned that this information could lead to a hazardous approach situation if the flightcrew either misinterprets these data, or lacks specific knowledge of other information not found on an IAP chart. For example, knowledge of specific distances and altitudes at which NAVAID signals from the Cold Bay VOR are reported as "unusable" is essential for the pilot who elects to begin an IAP to runway 32 from over the 40-mile DME IAF. Such information is also important because the en route MA is lower than the minimum reception altitude (MRA) specific for the area beyond the 40-mile IAF. The IAP chart does not provide that information.

In the World Airways accident, the flight was inbound to Cold Bay, from over the Pacific Ocean east of Cold Bay. The crew reported the flight's position to Cold Bay FSS as "125 DME out at FL 310." Clearance was issued for "...an approach to the Cold Bay Airport." The crew began an immediate en route descent to 3,500 feet.

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According to the CVR transcript, the crew discussed the requirements and specified minima for the ILS back course DME approach to runway 32 of the Cold Bay Airport. Crew conversation revealed that the captain did not plan to make a procedure turn. After calling out a DME reading of 29 miles, the copilot questioned the captain, "We should be a little higher than that out here shouldn't we?" The captain replied, "No, forty DME you're all right." About 3 minutes 18 seconds later the aircraft struck Mt. Dutton at the 3,500-foot level. Mt. Dutton is about 17 miles east of the Cold Bay Airport, 15 miles NE of the prescribed final approach course of runway 32.

The significant factors in the accident were the following:

1. The flight descended en route to 3,500 feet m.s.l. without reservation.

2. According to the information published in the Alaska Supplement of the Flight Information Publication (FIP), when the flight descended below 9,000 feet, it entered an area in which the Cold Bay VORTAC signals are reported as "unusable."

3. The descent altitude selected by the crew coincided with the 3,500 feet MA specified for an inbound flight on the final approach track between the 40-mile DME IAF and the 19.5-mile DME intermediate fix (IF).

The Safety Board does not question the accuracy of the data presented on the existing IAP chart, nor does it question the procedure as depicted. The IAP is satisfactory with respect to the criteria upon which it was established. However, we believe there is sufficient evidence to show that misunderstanding of the procedure is possible.

Another incident involving an apparent misunderstanding of the ILS back course DME approach to runway 32 at Cold Bay occurred on October 3, 1971. The pilot of the DC-8 told the Safety Board that his flight was inbound to Cold Bay from California on the same approximate route flown by the World Airways DC-8.

According to the pilot's statement, the approach plate was studied and discussed. Descent to 3,500 feet was started. To the best of his recollection, "... an intercept angle to the back course was to be established ... my first concern during the approach was around DME 25 and altitude of around 4,000 feet m.s.l. The DME began searching and became erratic. We had entered scattered to broken clouds at around 6,000 m.s.l. and at that time there was no visibility. ... I called out the erratic behavior of the DME to the captain. Almost immediately

we became contact and a mountain with large glaciers was sighted close off our left wing and extending into the cloud formation." The flight proceeded VFR to Cold Bay and landed on runway 32.

The pilot stated further that, "the thinking had been that if we were not established on the ILS course by the 20 DME, a 20 DME circle would be maintained until on course. Also, descent to 3,500 feet m.s.l., would be accomplished by that time. Our mental picture at that time was that the approach to that point would be over water." Examination of the approach chart showed that "our approach should have been minimum sector altitude until established on the approach leg and 40 DME."

In view of the pilot's statement and our findings in this accident, the Safety Board believes that positive steps should be taken to reduce the possibility of hazardous approaches into Cold Bay. To that end, the IAP chart for the ILS back course DME approach to runway 32 at Cold Bay could be modified in one of several ways:

1. Delete the 40-mile DME IAF from the IAP chart.

2. Flag the 40-mile DME IAF on the plan view of the IAP chart to show a crossing altitude of 7,000 feet and add the following note:

   "Descent below 7,000 feet to MSA, NOT AUTHORIZED unless established on the ILS localizer back course (or 141° radial) inbound. High terrain either side of final approach course within 40 miles."

3. Add a note of caution at the bottom of the plan view section of the IAP (near the 40 mile IAF) to advise, "NAVAID signals beyond 40 miles of the VORTAC are unusable below certain altitudes. See FIP for additional information."

4. Show pertinent NAVAID restrictions on the IAP chart. Add note: "High terrain either side of final approach course within 40 miles of the station."

These are only four ways in which the situation could be improved. The Safety Board realizes there are others, some of which might also improve IAP charts for airports where situations exist similar to those in Cold Bay. However, with regard to the situation in Cold Bay the National Transportation Safety Board recommends specifically that the Federal Aviation Administration:

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Modify the IAP chart for the ILS back course DME approach to runway 32 at Cold Bay, Alaska, in a manner that will highlight the altitude restrictions on the use of the VORTAC and the hazards associated with deviations from prescribed approach procedures.

REED, Chairman, McADAMS, THAYER, BURGESS, and HALEY, Members, concurred in the above recommendations.

By: John H. Reed
Chairman